

FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

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EDITORIAL COMMENT.

The New Naval Air Service.

From the Secretary of the Admiralty we have received a most important Memorandum, setting forth the details of the scheme of re-organisation of the Naval Air Service. The text of this Memorandum will be found on another page of this issue of FLIGHT, and from it will be seen that the Admiralty scheme is not so much one of re-organisation as of a complete re-casting of the whole organisation. In the first place, it constitutes probably the most whole-hearted admission that has ever been made of the enormously important place that aircraft will have in the warfare of the future—nothing approximating to it has been announced by any other Power or by ourselves. Under the new scheme aircraft assume an almost more definitely important place in the organisation of the Navy than the submarine branch, since the latter remains a part of the Naval organisation as such, while the air service is given a place of its own which is practically separate and apart from the main trunk, as it were.

We fully recognise that this is really not so when things are fully examined, and that the air service remains as much a part of the Navy as any other branch, but the point is that it is the only branch which is dignified by a

separate establishment and organisation of its own—a sort of *Imperium in Imperia*.

Undoubtedly this important departure—experiment it has been called, though we dislike the word as it is applied, for the reason that we can see nothing of the really experimental about it, but rather the outcome of a well-considered judgment—springs in great part from the keen personal interest which has been manifested in flying by Mr. Churchill ever since he took office as First Lord of the Admiralty. No Minister of our time has been at so much pains to become thoroughly acquainted with the work of his department as the present head of the Navy, with the result that probably no First Lord has at any period had so deep and thorough a knowledge of the work and needs of the Navy as Mr. Churchill.

Apart from the main interest of this important scheme of re-organisation the principal feature of the new idea is that connected with the admission of civilian airmen to the ranks of the newly constituted service. This is a very distinct departure—even more so than the experiment which was inaugurated nearly twenty years ago of transferring officers of the R.N.R. to the active list of the regular service. No distinction of rank, pay, or privileges will be made between officers entering from the Royal Navy or Royal Marines and those entering from civil life. In more ways than one this is a move of capital importance. It has been realised for a long time now that the Naval air service of the future will call for a very large number of officers and men who, under the existing scheme of things, can ill be spared from Fleet duties. Already the supply of combatant officers hardly keeps pace with the wastage caused by death, ill-health and retirement for various causes, and, if that is the case in a time of profound peace the problem must necessarily become a most serious one should we become involved in war with a great Naval Power. The possibilities of war wastage will be enormously enhanced by the employment of aircraft so that the problem of securing a sufficient number of trained officers to fill the gaps caused by casualties, already sufficiently serious, must necessarily be greatly magnified even to the point of impossibility of solution. It is evidently with this in view that the Admiralty has decided upon so drastic a departure from custom, for it is evidently the intention of the Whitehall authorities to gradually build up a large aerial corps which will in future become almost independent so far as the *personnel* is concerned of the combatant ranks of the Navy itself. Undoubtedly

this is the most attractive proposition that has hitherto been offered for the consideration of civilian airmen. They are given the opportunity of entering the finest Service in the world, on equal terms with those who have made of the Navy their life's profession, with good pay, excellent prospects, and, above all, that equality of rank which counts for so much in a Service which is apt to look rather askance at "Acting" and Reserve appointments.

There is one aspect of these Admiralty changes which must not be lost to sight, and that is the influence they will probably exert on aviation generally. Up to the present there has been somewhat of a lack of incentive to men to take up flying, unless they happen to be of the moneyed and leisured class and fond of flying as a sport. It offered very little of a career to the enthusiast who was keen but to whom it represented a means of livelihood. Now, however, with the prospect of entrance into the Naval Air Service the whole thing is changed, and an excellent career opens up to the skilled pilot possessed of the qualifications required by the Admiralty.

Collision in the Air.

Quite the most terrible, because at the same time the most dramatic, accident which has hitherto been recorded in the history of aviation was that which happened in Austria the other day, when an Army aeroplane collided in mid-air with a dirigible, involving both in a common ruin and causing the death of all on board the two craft. There have been accidents which involved a greater loss of life, but none which were quite the same as this. The main lesson which seems to be conveyed by this terrible affair is one of the future of war in the air. What seems to have happened was that the aeroplane

attempted to fly above the dirigible, the pilot misjudged the distance and touched the envelope of the larger craft, with the inevitable result that both were wrecked. In time of peace we regard such accidents as these as being very terrible in their character, but they will in the future be the commonplaces of war. It is easy to imagine that devoted aviators, knowing that actual collision in the air is the most effective weapon of the aeroplane against the dirigible will deliberately sacrifice themselves if by so doing they can involve the enemy's craft in their own ruin—and it will be the nation possessing the greater number of such devoted airmen which will win through in the end.

The Race to Manchester and Back.

It is only a bare four years since Paulhan by his flight from London to Manchester confounded the critics who decried the possibilities of aviation, and incidentally won for himself the £10,000 prize offered by the *Daily Mail*. When the prize was first offered, it is a matter of record that many people said it had only been put up because those concerned with its offer knew of a certainty that it would never be won! A lot of water has run beneath the bridges since then, and a lot of progress has been made in aviation. So great has been this progress, that when last Saturday's race was announced there was none to doubt the possibility, even the certainty, of the accomplishment. In the result the journey was safely carried out by three machines out of eight which started, and of the five failures not one was caused by any inherent fault in principles. Therefore, in spite of these failures having taken place, we feel that we are justified in regarding this event as yet another milestone of those which mark the progress of flight in this country.

Birthday Honours.

CONGRATULATIONS to Colonel (temporary Brigadier-General) David Henderson, C.B., D.S.O., Director-General of Military Aeronautics, War Office, who, on the occasion of His Majesty's birthday was created K.C.B.; and to Commander Mansfield George Smith-Cumming, R.N., retired, who recently secured his *brevet* at the Farman school, who was gazetted a C.B.

ROYAL FLYING CORPS.

THE following announcement appeared in the special issue of the *London Gazette* of Monday last containing the honours conferred in connection with the celebration of the birthday of H.M. the King:—

The King has been graciously pleased to approve of the under-mentioned officers being promoted by *brevet* for services in connection with the Military Wing, Royal Flying Corps. Dated June 22nd, 1914:—

To be Majors:

- Capt. (temporary Major) George H. Raleigh, the Essex Regiment.
- Capt. (temporary Major) John H. W. Becke, the Sherwood Foresters (Nottinghamshire and Derbyshire Regiment).
- Capt. (temporary Major) John M. Salmond, the King's Own (Royal Lancaster Regiment).
- Capt. (temporary Major) Charles A. H. Longcroft, the Welsh Regiment.

Among the Naval promotions announced on the King's birthday was the following:—

- Commander O. Schwann to be Captain. Dated June 22nd, 1914.
- The following promotions were announced by the Admiralty on the 24th inst.:—
- Lieuts. A. M. Longmore and J. W. Seddon to be Acting Lieut. Commanders, to date June 24th.

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending June 20th, 1914:—

Concentration Camp, Netheravon.—Headquarters, Headquarters Flight, Aircraft Park, Nos. 2, 3, 4, 5 and 6 Squadrons.—The training scheme, including Aircraft Reconnaissance M.T. Convoy runs, experiments, lectures, conferences and committees were continued daily throughout the week. The aircraft exercises consisted of locating the headquarters of units, in searching lines of advance and in estimating the length of columns on the

road. The M.T. carried out several convoy runs by night. It has only been necessary to deviate from the fixed programme on one occasion. This was in consequence of the prevalence of a thick ground mist.

The evenings from 6 onwards are devoted to games and athletics. No. 2 Squadron won the inter-Squadron Football Cup. The annual Sports of the Royal Flying Corps (Military Wing) take place on the 20th. The annual dinner of the warrant officers and sergeants took place at the Holborn Restaurant, London, on the 13th inst. Serjeant-Major Ramsay, No. 3 Squadron, the senior warrant officer was in the chair, General David Henderson and Colonel Sykes were amongst the many officer guests present.

No. 1 and 7 Squadrons, Farnborough.—The organisation of these was continued at Farnborough.

The Use of Aircraft in Somaliland.

ASKED in the House of Commons as to whether he had any information showing that two British officers were at present in Somaliland conducting inquiries as to the feasibility of using an airship for the purpose of an expedition to subdue the Mullah, Mr. Harcourt, Secretary for the Colonies, stated two British Officers with experience of aeronautics have recently visited Somaliland, but it is at present inadvisable in the public interest that any statement should be made regarding the objects of their visit.

Liverpool Flying Corps Scheme Abandoned.

AT a meeting in Liverpool on Wednesday, it was announced that the Executive Committee which has been considering the matter had been unable to recommend any practical scheme for the formation of a local Flying Corps. It was found impossible to get either the War Office or the Admiralty to guarantee the local facilities which were desired. The general committee decided to return the amounts collected to various subscribers, thanks being tendered to Messrs. W. E. and C. A. Cain for their patriotic offer of two aeroplanes.

The Seaplane Disaster.

THE body of Commander A. Rice, the passenger in the seaplane which fell into Southampton Water on June 4th, was washed ashore at Fishbourne, Isle of Wight, on the 16th inst. At the inquest held on the following day, a verdict of "Accidentally Drowned" was returned.



THE KING'S BIRTHDAY.—General Smith-Dorrien reviewing troops at Ludgershall. In our photograph the "fly past" of one of the aeroplanes is seen at the moment of dipping before the saluting base.

Photo by Alfieri.

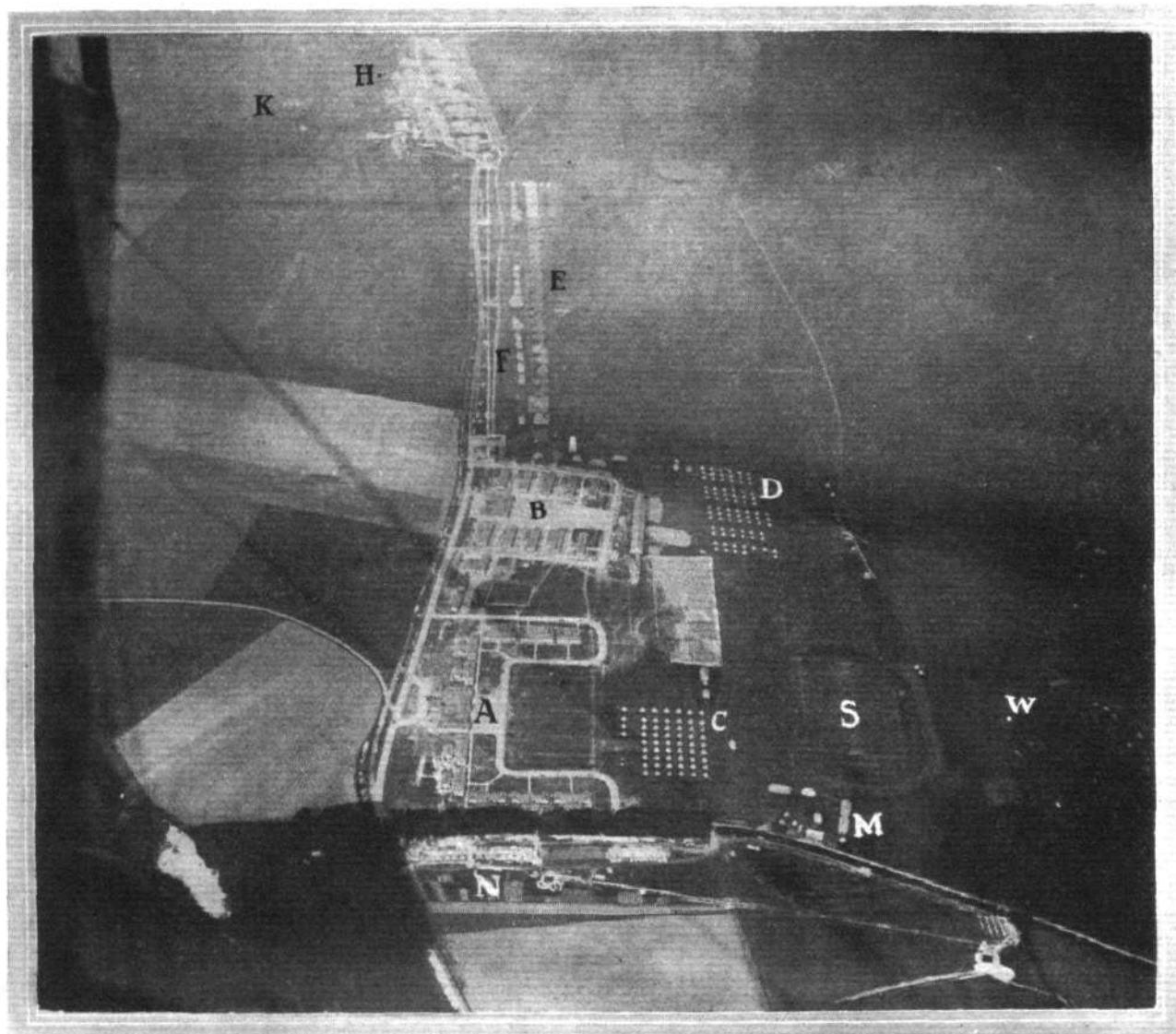
ROYAL FLYING CORPS (MILITARY WING) AT NETHERAVON. THE CONCENTRATION CAMP.

DURING last week, through the courtesy of General Sir David Henderson, K.C.B., we were privileged to spend a few days at the Concentration Camp of the Military Wing of the Royal Flying Corps at Netheravon, where there are upwards of 700 officers and men of the Headquarters Flight, Aircraft Park, Nos. 2, 3, 4, 5 and 6 Squadrons, and a detachment of the Kite Section. As the result of our visit we are prepared to affirm that whatever may be the relative position of any other branch of the Service compared with that of foreign powers, the Royal Flying Corps should be able to render an entirely satisfactory account of itself when occasion arises for its employment against the King's enemies; and Col. Sykes, through whose efforts the Camp largely came into being, as well as his capable Staff, are to be congratulated upon the results which they have been able to achieve. So great indeed is the progress which has been made, and so high is the standard of efficiency attained that it is most difficult to believe that it is only a little more than two years since this Corps was first formed.

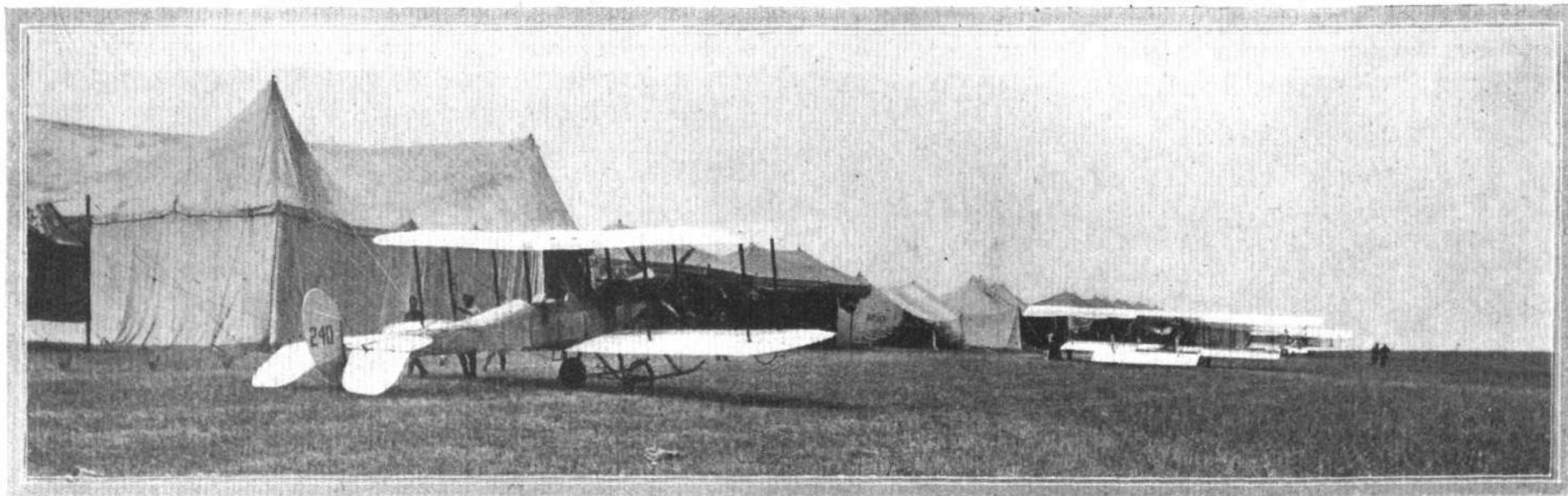
Of the military value of bringing the various squadrons together so that they may engage in combined exercises under conditions that nearly approximate to those that will exist during war, exchange opinions and discuss various aspects of the possibilities of aerial

warfare we need hardly enlarge upon here, as this aspect of the Concentration will be clearly manifest after a perusal of the subsequent matter contained in this article.

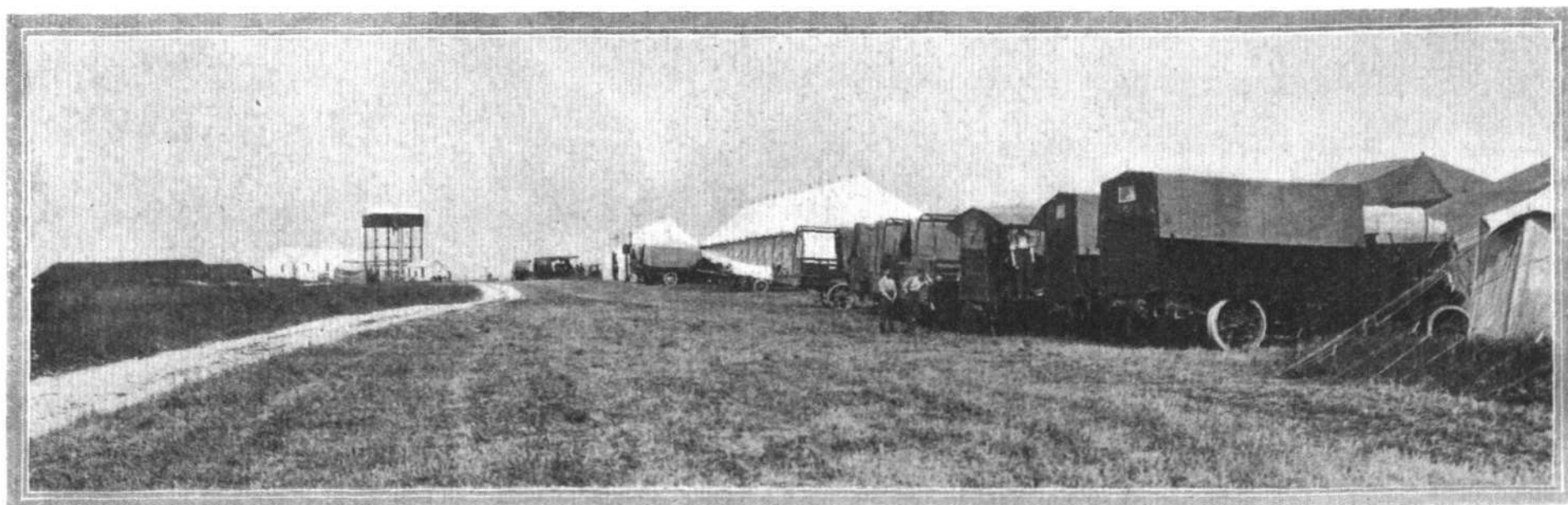
One is apt to measure military strength by numbers; but those who are acquainted with the art of war are well aware that morale is of far greater importance than numerical superiority, and organisation than either of these factors. The possession of a large number of efficient military machines is most essential; and compared with other European Powers in this respect we are undoubtedly inferior; but a close inspection of the Concentration Camp at Netheravon reveals the fact that the morale and skill of the officers and men of the R.F.C., as well as the organisation involved in the handling and transport of machines, stores, spares, men, &c., leaves nothing to be desired. The keenness and cheerfulness of the whole camp is of the highest order despite long and irregular hours; for although in the ordinary routine reveille is sounded at 6 a.m. and "lights out" at 10.15 p.m., the actual working day—normally, from 8 a.m. to 4.30 p.m.—is sometimes much more protracted, since early morning flying and night exercises with machines and with transport are freely indulged in outside these hours. Nevertheless the men have ample leisure during the



View of the Concentration Camp of the Military Wing of the Royal Flying Corps at Netheravon, taken from an aeroplane at a height of 2,000 ft. on the 19th inst. A. Permanent quarters of the officers of Nos. 3 and 4 Squadrons. B. Permanent quarters of the men of Nos. 3 and 4 Squadrons. C. Officers' lines of the visiting squadrons. D. Men's lines of the visiting squadrons. E. Temporary aeroplane sheds of the visiting squadrons. F. Transport of the visiting squadrons and Aircraft Park. H. Permanent aeroplane sheds of Nos. 3 and 4 Squadrons with repair shops, &c., at the back. K. Portion of the Kite Section. M. Mess tents of the officers of visiting squadrons. N. New married quarters for men of Nos. 3 and 4 Squadrons. S. Sports ground. W. Wireless station.



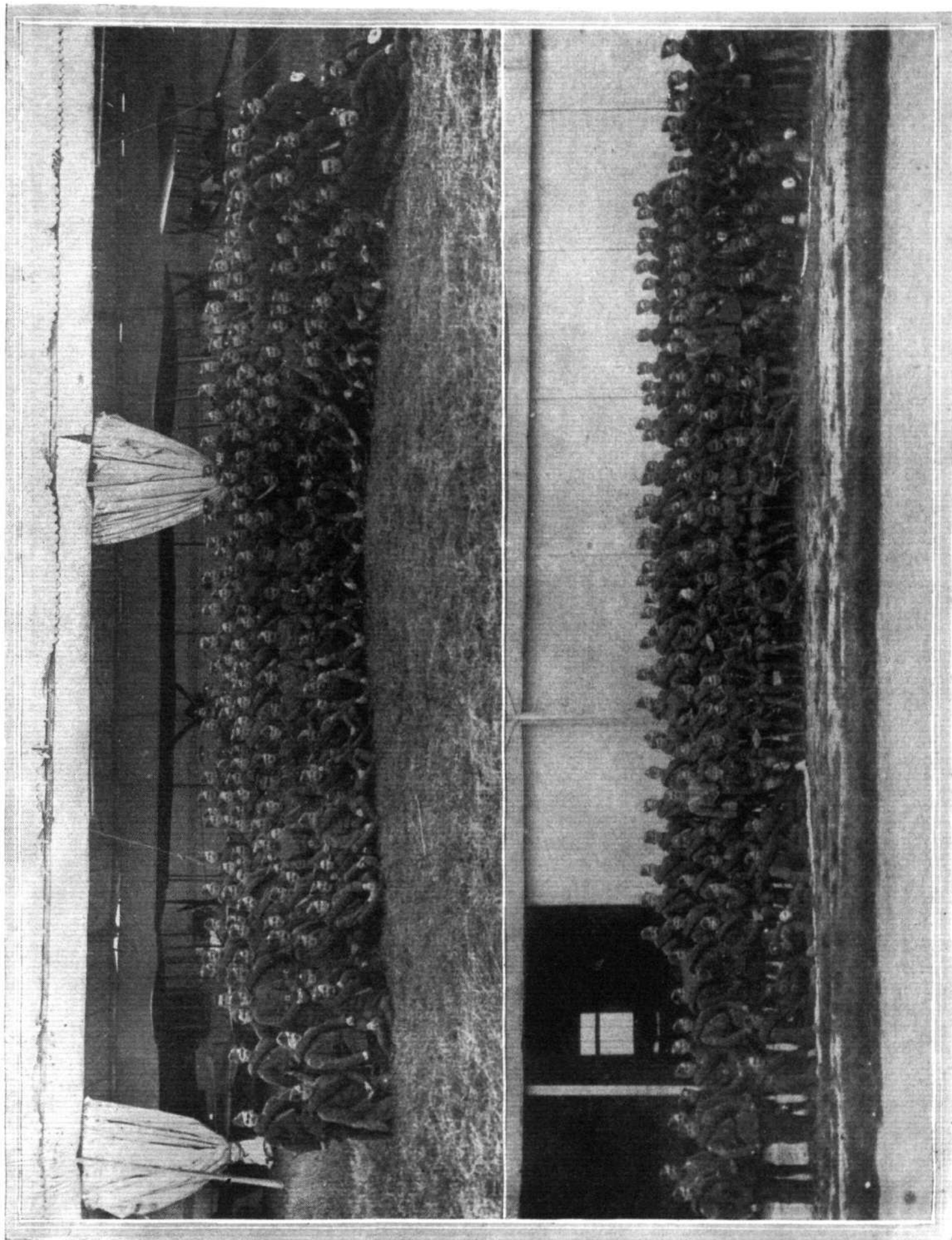
A view of the temporary aeroplane sheds at the Concentration Camp at Netheravon.



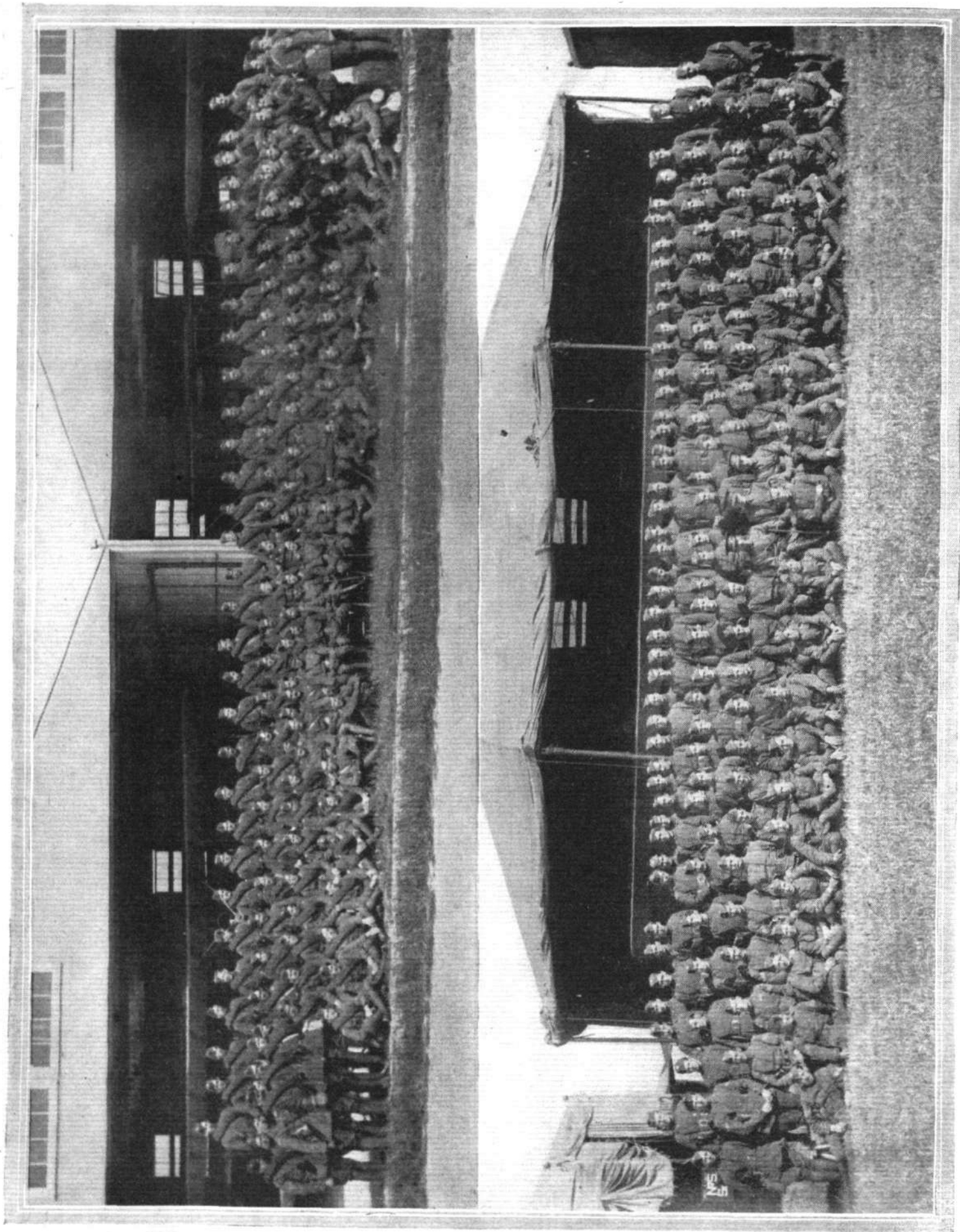
ANOTHER VIEW OF THE TRANSPORT AND REPAIR LORRIES OF THE R.F.C. AT NETHERAVON.—The large Piggott tent which "houses" the B.E.s, of No. 2 Squadron is seen in the centre of the photograph.



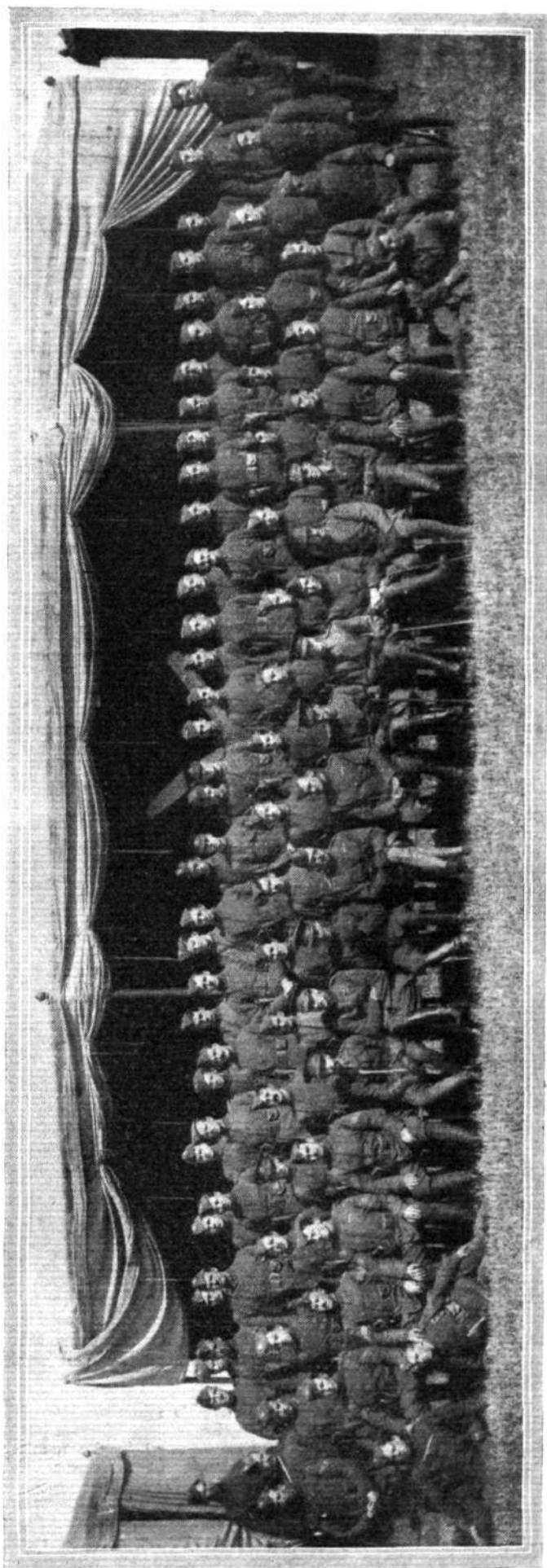
Officers, N.C.Os. and men of the Headquarters Flight (top) and the Aircraft Park (bottom) of the Royal Flying Corps at Netheravon.



Officers, W.O.s, N.C.O.s, and men of Nos 2 (top) and 3 (bottom) Squadrons of the Royal Flying Corps at Netheravon.



Officers, W.O.s, N.C.O.s, and men of Nos. 4 (top) and 5 (bottom) Squadrons of the Royal Flying Corps at Netheravon.



Officers, W.O.s., N.C.O.s. and men of No. 6 Squadron of the Royal Flying Corps at Netheravon.

day to indulge in various games—tennis, cricket, football, &c.—and to prepare for the sports that were held on Saturday last and in which several officers competed.

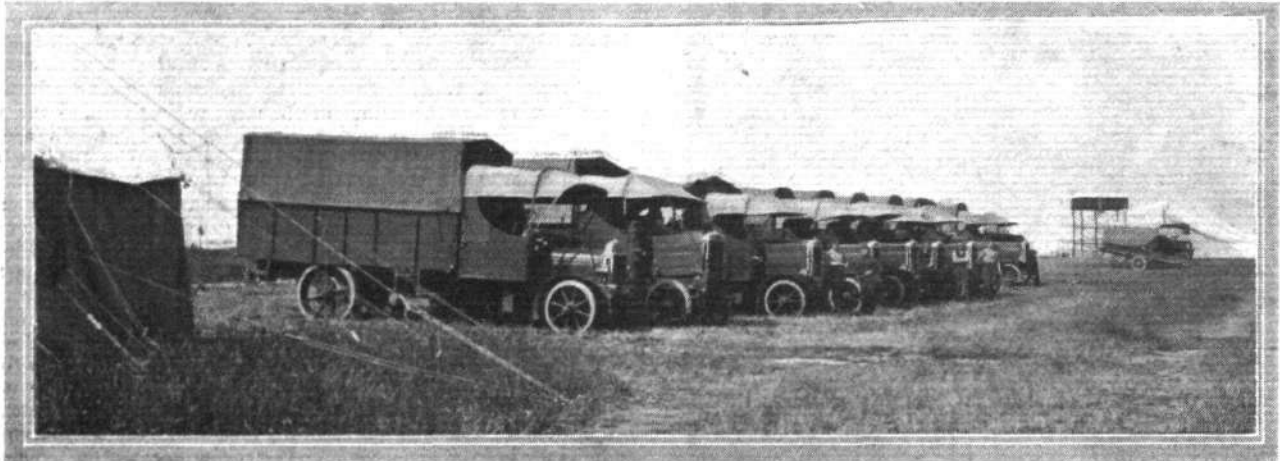
The general arrangement of the Camp may be seen on reference to one of the accompanying photographs, which was taken on Friday last from an aeroplane at a height of 2,000 ft. In the lower middle portion of the picture are the permanent quarters of the officers of Nos. 3 and 4 Squadrons—one-storey buildings arranged around an open square, the men's quarters being immediately beyond them in the photograph; while the bell tents seen directly in front of these two sets of buildings are the temporary quarters of the officers and of the men, respectively, of the visiting squadrons. The permanent aeroplane sheds, which are fitted with a system of hot water heating, are shown at the top middle portion of the photograph; while the temporary tents, which are of the Piggott, Hervieu, and Factory types—the last-mentioned being exceptionally substantial in construction, and capable of being greatly improved without much trouble—are seen arranged in a long line between the aeroplane sheds and the men's quarters of Nos. 3 and 4 Squadrons. The fine Piggott marquee at the extreme end of the line, which shelters the whole of the B.E.s. of No. 2 Squadron, is extremely large and lofty, and is well lighted with the side curtains drawn, so that work may be carried on under the most adverse weather conditions. The other tents contain one machine apiece, and are much more portable and more readily erected. The question of the time taken in the erection of these tents, however, depends largely upon the previous experience of the erectors, as, for example, the last tent was erected in about one-fifth of the time that it took to set up the first aeroplane tent. In this particular branch of work much useful information has been obtained that should prove of service on future occasions. It is interesting to learn that one man sleeps in each of the smaller aeroplane sheds and two men in the large Piggott tent.

At the back of the permanent aeroplane sheds of Nos. 3 and 4 Squadrons are the repair shops—fitters, carpenters, blacksmiths, &c.—fully equipped with the plant required for dealing with any such work as may be rightly considered as coming under the heading of repairs—stores, transport and repair wagons, a meteorological office, and a photographic room, for the use of these two squadrons, the shops and other buildings for each being quite separate. Tents have been erected to "house" the staff and equipment necessary for the remaining squadrons. Some of these are located in the vicinity of the foregoing, but the majority are placed behind the temporary aeroplane sheds, between them and the road, where there is also the wireless station of the Headquarters Flight, the permanent wireless station being situated at some distance in front of the officers' quarters. It was very satisfactory to note the matter-of-fact way in which work was proceeding—the men going about their duties as though they were in their permanent buildings. Here were mechanics and smiths engaged on various repairs; there, men and boys were busy stitching wing and body coverings, whilst further on a flight-sergeant was lecturing on the mechanism of the Gnome engine, and a wireless operator was receiving a message from an aeroplane miles away. In front of the permanent shed is a wide asphalted road which is used in starting and handling machines during wet and bad weather. Here also a flagstaff has been erected upon which the flags and streamers are hoisted for indicating—according to the colour and position of the flag or streamer—that flying is in progress, the direction of the wind and the direction in which a pilot should rise and land. From the road at the back of the aeroplane sheds the ground slopes downwards towards the north, and at the foot of the incline a portion of the Kite Section with horses is quartered, another portion with balloons being at present at Lark Hill, a few miles away. In every respect the Camp is complete, and one realises after making a tour of the sheds that all which is essential for efficiency has been brought together, while that which can be dispensed with has been left behind.

Reconnaissance.—From the fact that it is the class of work in which aeroplanes will be principally engaged in actual warfare, reconnaissance has constituted the major portion of the work upon which the machines have been engaged since the formation of the camp. These reconnaissances have been almost entirely carried out in the morning as part of a regular scheme of training with a prearranged object in view, as the afternoons, with the exception of Wednesday and Saturday afternoons which are half-holidays, have been in the main devoted to the performance of committee work and the attendance at the lectures delivered by various members of the corps, which are referred to later. But when the period of training is passed and an officer has become a skilled pilot, flying merely for the sake of flying and piling up the mileage flown has, comparatively speaking, little educational value, so that very few pilots now go up without some definite reason for so doing, and there is a general tendency to discourage

promiscuous flying. Hence it will be evident, from the enormous mileage which has been covered by Army pilots and observers, that much real progress has been and is now being made towards military efficiency, and the keenness that is general throughout the corps is evidenced by the fact that machines are often taken out on occasions other than those which form part of the organised scheme of training.

billeted for the night at a certain town, with the heads of columns headed in a definite direction. The opposing force represented by the aircraft of the R.F.C. at, say, Devizes had despatched aircraft to reconnoitre the enemy's position and the possible lines of advance, in order to discover the direction in which he (represented by R.F.C. lorries) was moving. Then, it was required that the headquarters of



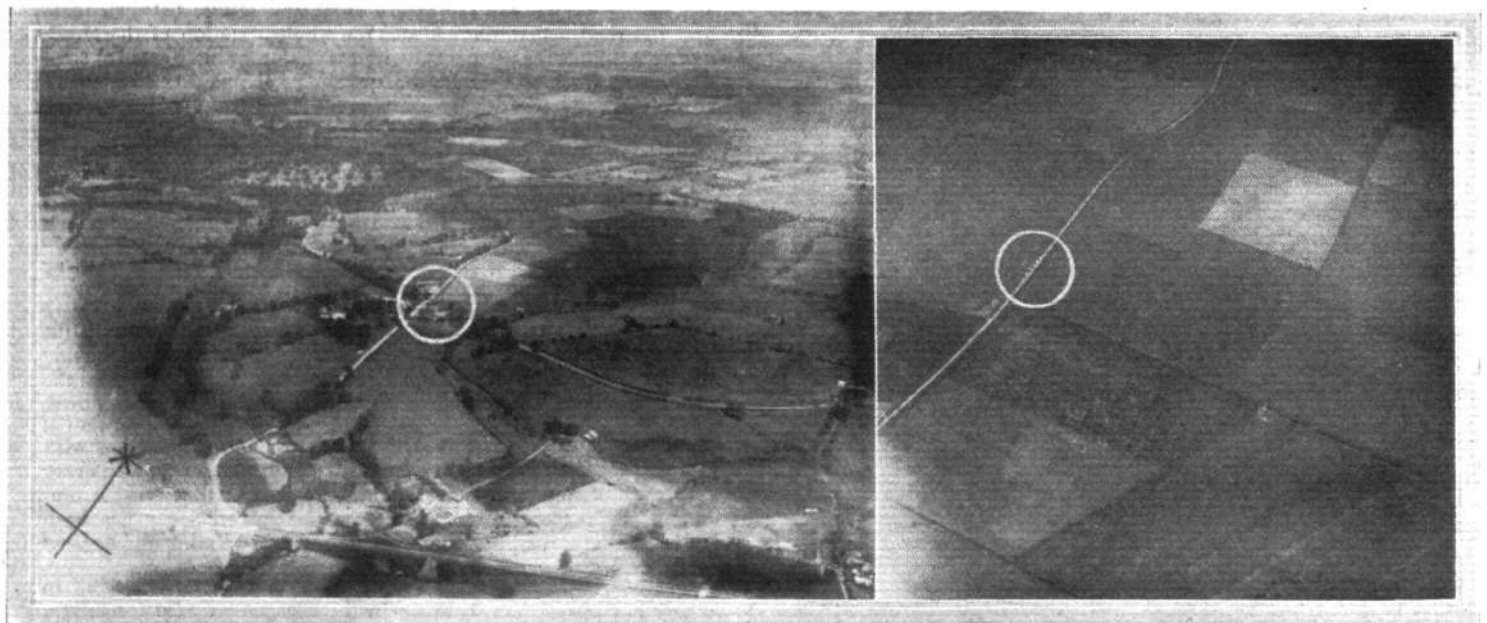
"Flight" Copyright.

A group of Transport wagons at the rear of the temporary aeroplane sheds, showing the water-tower in the distance.

In general, each regular pilot is attached to one machine, since by so doing he becomes more conversant with its possibilities, and, therefore, more proficient in handling it; while, in addition, all pilots do not like the same adjustment of the control wires.

During the first three days after the establishment of the Camp, no regular system of observation was instituted, as the men were more or less occupied in settling down to their duties; but since that time, so sound has been the scheme originally devised that the programme set out has been followed practically without exception. The reconnaissances have progressed by steps. In the first instance, the observers of the machines, which included B.E.s., R.E.s., Maurice and Henry Farmans, Avros and Sopwiths—some of which were

an army, which were represented by lorries, a few horses, a flagstaff with flag, bivouac shelters and a few men, holding the portion of the country within a certain defined area, should be located. They had also to determine the position of two pairs of M.T. vehicles travelling on a certain road, and to estimate the distance between them. In the succeeding experiment, a free balloon carrying Majors Hon. C. Brabazon and Musgrave as pilot and passenger respectively, ascended from a point within an area defined by the position of various towns as on previous days. This balloon was intended to represent an airship with its engines disabled, which had been seen drifting in this area, and the airship pilot was permitted to fly at any elevation he chose until a certain time, after which



Two photographs taken from an aeroplane during reconnaissances made by the R.F.C. on the 8th and 9th inst., the object of which information was desired being discernible within the small circles. The photograph on the left was taken from a height of 2,100 ft., and that on the right at 2,500 ft.

fitted with dual control—were instructed that troops of an assumed hostile force were operating within a certain area, limited by the position of certain named towns. The troops were supposed to be stationary on, or close beside roads, and were represented by mechanical transport vehicles, and small groups of N.C.O.s. and men of the R.F.C. The observers were required to reconnoitre and report on the area indicated with a view to discovering the location of the enemy.

Next, it was assumed that an army marching on Devizes had

he must maintain a height of 2,000 ft. To stimulate interest in the object of this particular reconnaissance—to discover the position of the balloon—the work was regarded in the nature of a contest between squadrons, and marks were awarded to the machines discovering the position of the balloon within two hours from starting, suitable time allowances being made according to the type and speed of the machines. The first machine to discover the balloon was awarded 30 marks, the second 29 marks and so on—the aggregate marks so

obtained by the several machines of a squadron being divided by the number of machines of a squadron in order to obtain the average marks earned. That squadron having the highest average was adjudged the winner of the reconnaissance.

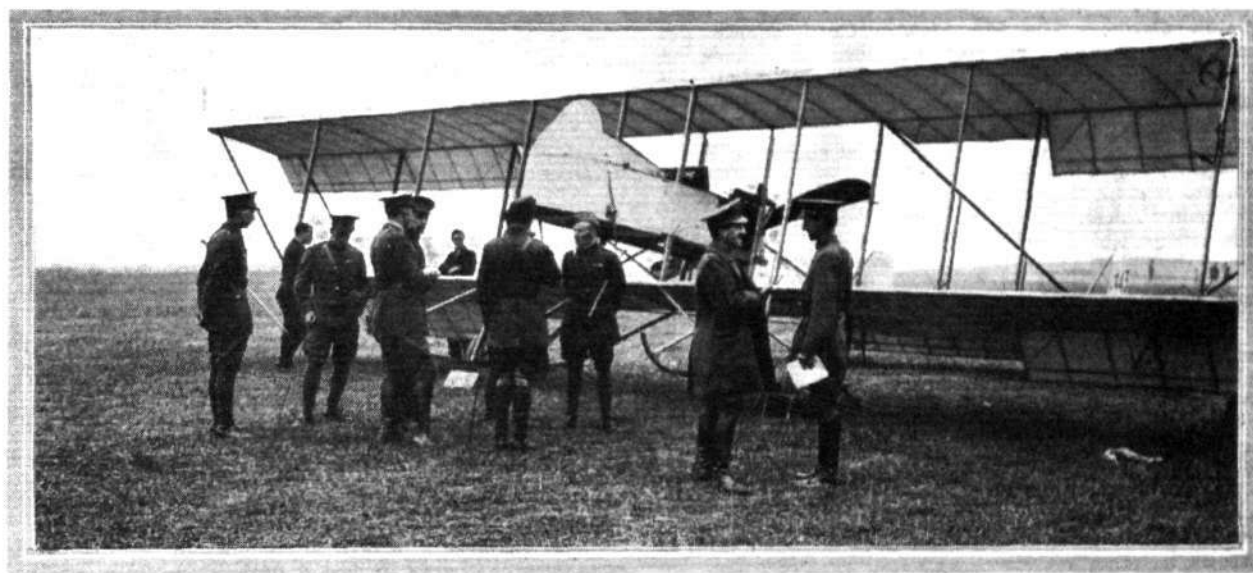
The reconnaissances we have just outlined are those which have formed part of the scheme of combined training between the units of the R.F.C., but additional work has also been carried out in conjunction with and independently of troops upon the ground with marked success, and since these manoeuvres have been completed under, in some cases, extremely adverse weather conditions, exactly as would be the case in actual warfare, the results are highly satisfactory. It may be added that the reconnaissances were made at a height of not less than 2,000 ft., as, though special anti-aircraft guns are in existence, they have not yet reached the stage of perfection when immediate danger may be apprehended by a pilot flying at much above this elevation.

It will be readily admitted that the graded character of the exercises greatly enhances their value as a training for observers, and on the conclusion of a reconnaissance the observers were required to sit down and write a report upon what they had seen in the area under

ordered to land on two temporary landing grounds successively during flight.

But in effecting a landing it is most important that a pilot should know in what distance it is possible for his machine to come to rest on the ground after passing over an obstacle of a given height, say, a hedge or a clump of trees; and hence, prior to the experiments in landing just indicated, tests were carried out to determine what this is, for different machines. A fine cord, to which small flags or streamers were attached so as to render it visible to the pilot, was suspended between two poles at a definite height above the ground, and the pilots were required to land their machines as soon as possible after flying over this cord.

So far the landing tests which have been referred to have been carried out during the day; but one, if not the only, difficulty encountered in night flying, especially in cross-country work—and night flying will probably be an important section of the work on active service—is that of knowing where and when to land with safety, that is, the location of a suitable landing ground and a knowledge of the proximity of that ground relative to the machine. Hence, experiments have been conducted in this direction. At



"Flight" Copyright.

Group of officers, including Col. Sykes, Majors Brancker and Beck, and Mr. O'Brien Hubbard, in front of a Maurice Farman at Netheravon, prior to a flight.

observation; so that the fact that the schemes were satisfactorily carried out in every case, in some instances reports being received under an hour and a half reflects great credit upon all concerned. We are enabled by the courtesy of Col. Sykes and Major Musgrave to reproduce photographs of the object of several of these reconnaissances, which were taken from an aeroplane at a height ranging between 2,000 and 2,500 feet. From these, the microscopic appearance of the object sought at this elevation will be seen; and seeing, the reader should be able to appreciate the reason why the training of observers is a lengthy and, of necessity, a continuous process.

Landing of Aeroplanes.—These reconnaissances were succeeded by a series of flights, in the course of which it was necessary for the pilot to land on temporary landing grounds. The military pilot, unlike his civilian counterpart, does not fly between two definite recognised landing grounds, but, particularly when operating on foreign soil, may often have, at short notice, to effect a landing in an entirely unknown country during a cross-country flight; and since the problem of flight at the present day is largely one of landing safely, and involves not only a knowledge of how to land but also the ability to readily choose a landing ground of a suitable character and size with expedition whilst flying, practice in this direction has been indulged in. On the first day of these exercises, the pilot was required to land on one temporary landing ground, and after this was successfully accomplished each squadron was

first they were confined to landing within a given known area, that is, one of which previous experience had been gained.

For indicating the exact position of the place where the pilot should land, various forms of lights, such as special designs of paraffin flares, magnesium lamps, petrol in buckets, &c., have been tried; and to enable the approach of the aeroplane to be observed, a head-light was mounted on the machine. With the assistance of a predetermined system of signals, communications passed between the machine and the ground, when the pilot was ready to descend; whereupon the flares were lighted and the pilot made a successful landing without difficulty. It will be clear, however, that although such a procedure is possible when the landing ground is already well known and the ground staff is available to respond to the signals from a machine there are many circumstances under which a pilot may be compelled to land without assistance from the ground and where he must also find a suitable spot with external aid. For this reason attempts were subsequently made to land without ground assistance, but the difficulties encountered, however, particularly as regards the production of a beam of light of sufficient intensity and adequate carrying power, yet which is capable of covering a wide area upon the ground, show the need for still further experiment, although so far as the tests have proceeded, much valuable information as to the possibilities in this direction have been gained.

(To be concluded.)

Military Aeronautics in Italy.

THE Italian Government is at present considering a scheme, prepared by the Minister of War, General Grandi, for the reorganisation of military aeronautics in Italy. It is proposed to nominate two commandants-in-chief of aeronautics, to create a battalion for dirigibles, another for balloons and a third for aeroplanes, to start an

establishment for aeronautical construction, to organise a school for military pilots as well as a technical advisory department. It is also proposed to create an Institute for Aeronautics as well as a civilian technical staff comprising engineers, professors, pilots and mechanics. Should these proposals be approved the Government will increase their Budget by £19,000 to provide for them.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Diary of Events.

- June 27 ... Balloon Race. Hurlingham Club, Fulham, S.W.
 July 11 ... International Correspondence Schools Race, London-Paris-London. Hendon Aerodrome.
 July 11 ... Balloon Race. Hurlingham Club, Fulham, S.W.
 Aug. 1-15 *Daily Mail* £5,000 Circuit of Britain Race. Starting from Southampton Water.
 Aug. 22-29 Gordon-Bennett Eliminating Trials. Upavon, Salisbury Plain.
 Sept. 19-28 Gordon-Bennett Aviation Race. Buc, France.

HENDON AERODROME.

Members of the Royal Aero Club are admitted free to the Hendon Aerodrome on presentation of their Club Membership Cards. The Membership Card admits the Member only—motor cars must be paid for.

Daily Mail £5,000 Circuit of Britain Race.

The following entries have been received:—
 Messrs. White and Thompson—

1. Curtiss Biplane. Two 100 h.p. Curtiss engines. Pilot: Mr. A. Loftus Bryan.
2. Curtiss Biplane. 125 h.p. Anzani engine. Pilot: Capt. Ernest C. Bass.

Sopwith Aviation Co., Ltd.—

1. Sopwith Biplane. 150 h.p. Sunbeam engine. Pilot: Mr. C. Howard Pixton.
2. Sopwith Biplane. 100 h.p. English *monosoupape* Gnome engine. Pilot: Mr. H. G. Hawker.

Grahame-White Aviation Co., Ltd.—Grahame-White Biplane. 100 h.p. English *monosoupape* Gnome engine.

Messrs. A. V. Roe and Co., Ltd.—Roe Biplane. 150 h.p. Sunbeam engine. Pilot: Mr. F. P. Raynham.

Eastbourne Aviation Co., Ltd.—Tractor Biplane. 120 h.p. Green engine. Pilot: Mr. F. B. Fowler.

Blackburn Aeroplane Co., Ltd.—Blackburn Hydro-Biplane. 130 h.p. Salmson engine. Pilot: Mr. Sydney Pickles.

Late entries will be received up to 12 noon, June 30th, 1914, in which case the Entrance Fee will be £150.

Mr. H. E. Perrin visited Scotland last week-end and discussed the arrangements for the Scottish Controls with the Scottish Aeronautical Society. He also visited Fort George, Nairn, and Lossiemouth in company with Lieut. D. A. Oliver, R.N., to ascertain their suitability for a Control in the Moray Firth.

Daily Mail £10,000 Prize, Cross-Atlantic Flight.

The Aero Club of America has notified the Royal Aero Club that the preparations for the Cross-Atlantic Flight by Lieut. J. C. Porte, R.N., are now well advanced, and in all probability a start will be made during the next two months.

Balloon Race at Hurlingham on Saturday, June 27th, 1914, at 3 p.m.

The Long-Distance Balloon Race for the Cup presented by Mr. A. Mortimer Singer will start from the Hurlingham Club, Fulham, S.W., to-morrow at 3 o'clock. The following are the Competitors in the order of start:—

- | Competitor. | Balloon. |
|---------------------|------------------------|
| 1. Lionel H. Mander | "Meteor" (50,000 c.f.) |
| 2. C. F. Pollock | "Polo" (50,000 c.f.) |

- | | |
|--------------------------------|-----------------------------|
| 3. Capt. Lionel L. Atherton... | "Thistledown" (12,000 c.f.) |
| 4. Lieut. T. G. Hetherington | "Dunlop" (50,000 c.f.) |
| 5. Mrs. John Dunville | "Banshee II" (80,000 c.f.) |
| 6. Lieut.-Col. E. M. Maitland | "Pompadour" (50,000 c.f.) |
| 7. Mrs. A. Mortimer Singer... | "Planet" (80,000 c.f.) |

Members will be admitted free to the Hurlingham Club on presentation of their Club Membership Cards.

The late Mr. Gustav Hamel.

A Memorial Service to the late Mr. Gustav Hamel was held at the Grosvenor Chapel, South Audley Street, W., at noon on Wednesday, the 24th inst. The service was conducted by the Rev. H. R. L. Sheppard, who delivered a most impressive address to a large and representative congregation. The Club was represented by Mr. F. K. McClean, Mr. E. V. Sassoon, Mr. C. G. Grunhold, and Mr. H. E. Perrin (Secretary).

International Correspondence Schools Race. London-Paris-London.

(Under the Competition Rules of the Royal Aero Club.)

Organised by the Royal Aero Club and the Aero-Club de France. Starting and finishing at the Hendon Aerodrome, Hendon, N.W.

SATURDAY, JULY 11TH, 1914.

PRIZES.

Fastest Time... 1st Prize: £500. Presented by the International Correspondence Schools.

Handicap .. 1st Prize: £300. Presented by the Royal Aero Club. 2nd Prize: £150. Presented by the International Correspondence Schools. 3rd Prize: £50. Presented by the International Correspondence Schools.

The Entrance Fee is £5 per aircraft, and entries will be received up till 12 noon, Saturday, June 27th, 1914. Late entries will be received up to 12 noon, Saturday, July 4th, 1914, in which case the Entrance Fee will be £10.

The Entrance Fee will be returned to each competitor who completes the course by 10 p.m. on Saturday, July 11th, 1914.

The Entry Form, which must be accompanied by the Entrance Fee, must be sent to the Secretary of the Royal Aero Club, 166, Piccadilly, London, W.

Full particulars and entry forms can be obtained from the Secretary, Royal Aero Club, 166, Piccadilly, London, W.

The Home Office has granted an exemption from Aerial Navigation Orders to all competitors taking part, permitting them to leave and enter England without alighting in a prescribed landing area. Exemption has also been granted permitting Foreign Competitors to fly direct to the starting point, Hendon Aerodrome, between July 8th and 11th, and also to return from England between July 11th and 14th without landing in prescribed areas. The course to be flown under this exemption is *via* Folkestone.

At the time of going to Press (Wednesday), the following entries have been notified:—

Lord Carbery.

Grahame-White Aviation Co., Ltd., three entries, pilots to be nominated later.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

A VISIT TO THE NATIONAL PHYSICAL LABORATORY.

A LARGE and distinguished company availed themselves of the privilege of inspecting the work at the National Physical Laboratory on Friday last, June 19th, in connection with the annual reception held by Sir William Crookes, O.M., President of the Royal Society and Chairman of the General Board of the National Physical Laboratory, Lord Rayleigh, O.M., Past President of the Royal Society, Chairman of the Executive Committee, and Dr. R. T. Glazebrook, Director of the Laboratory.

So much splendid work is carried out in the various departments that to mention everything would be impossible. In the department for aeronautics, the visitors were given an excellent opportunity of studying the method employed for testing aeroplane models and parts. The two older wind channels of three feet and four feet diameter respectively were shown in operation, whilst the new 7 ft. channel which is in the course of construction afforded an opportunity of examining the internal arrangement. The fan has

in this channel been supplanted by a four-bladed propeller, somewhat similar to those employed on B.E. machines, driven direct off an electromotor. A demonstration was also given of how the eddies set up by a body placed in a current of water are photographed by projecting a strong arc light on to the portion of the water channel nearest the body under test, and by causing some coloured fluid to ooze out of a series of small holes in the body, thus rendering the eddies visible.

In another department an inspection was made of the Froude tank in which are carried out tests on ships models and hydro-aeroplane floats. A demonstration was given of how a model of a boat is tested, and its behaviour automatically shown on a large graph mounted on the carriage which propels the model and which travels the whole length of the tank. Visitors were allowed to take a ride on this carriage with the operator in charge, and thus had an excellent opportunity of seeing this extremely ingenious device at work.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Naval Flying.—Monday, last week, No. 153 Bristol tractor, 43 Bristol tractor, 31 Henry Farman, 104 Sopwith, 49 B.E. Sub-Lieut. Beevor to Isle of Grain on 70 Maurice Farman.

Tuesday, No. 49 B.E., 45 Caudron, 64 Short, 31 Henry Farman to Isle of Grain, 150 Avro, 7 Deperdussin, 43 Bristol tractor.

Wednesday, Nos. 34, 64 and 1 Shorts, 103 Sopwith. Mr. Pixton from Calshot.

Thursday, 103 Sopwith.

Friday, 21 Short tractor. Sub-Lieut. Lowles from Isle of Grain.

Civilian Flying.—Friday, Mr. Alec Ogilvie made two short flights on his 50 h.p. N.E.C.-Wright biplane.



Lieut. Tennant, who obtained his certificate on a Vickers biplane at Brooklands School on June 9th.

Sunday, Mr. Geo. Jezzi made two flight's, one solo about 15 mins. and one with passenger.

Brooklands Aerodrome.

ON Monday morning, last week, the Blériot, Bristol and Vickers pupils out; in the afternoon to Farnborough: Mr. Hawker on the 100 h.p. Sopwith, Mr. Mahl on the 80 h.p. Sopwith, and Mr. Raynham on the 80 h.p. Avro; Mr. Alcock from Sunbury on the 100 h.p. Sunbeam; wind varied between zero and 28 m.p.h.

Mr. Hawker back from Farnborough Tuesday afternoon on 100 h.p. Sopwith, Messrs. Jullerot, Merriam and Stutt solo flying on Bristol biplanes, Mr. Mahl on the 80 h.p. Sopwith, Mr. Gower on the 50 h.p. Blériot, and Mr. Dukinfield Jones with lady passenger on the D.F.W. Fine "looping" exhibition by Mr. Hawker on 100 h.p. Sopwith. Vickers, Bristol and Blériot pupils at work. Wind variation 0-21.

Wednesday, arrival of new Bristol armoured "Scout," also of Lord Carbery's Bristol "Scout," Messrs. Jullerot and Stutt on Bristol biplanes; in the afternoon, Mr. Mahl on 80 h.p. Sopwith, Mr. Dukinfield Jones solo and with lady passenger on D.F.W., Mr. Serge de Bolotoff taxiing his triplane, Mr. Busted on the new Bristol armoured "Scout," another fine looping display (12 loops) by Mr. Hawker on 100 h.p. Sopwith, Bristol and Vickers pupils out. Wind variation 0-14 m.p.h.

Vickers, Blériot and Bristol pupils out Thursday morning, Mr. Merriam on Bristol biplane, Mr. Barnwell on Vickers gun 'bus, and afterwards on same machine to Dartford with Mr. Knight as passenger.

Thursday afternoon an even finer looping display by Mr. Hawker on 100 h.p. Sopwith, both with engine shut off and with engine full on; Mr. Barnwell, with Mr. Knight as passenger, arrived back from Dartford on 100 h.p. Vickers gun 'bus; Messrs. Jullerot, Merriam and Stutt out on Bristol biplanes; Lord Carbery on his Bristol "Scout"; Mr. Mahl on the 80 h.p. Sopwith; Mr. Wilberforce on the 45 h.p. Anzani-Blériot; Mr. Serge de Bolotoff testing engine and propeller of his triplane; Bristol, Vickers and Blériot pupils out; *brevet* tests in good style by Mr. J. L. Parker (Vickers, altitude 1,400 ft.) and Mr. Chambers (Bristol, altitude 900 ft.). Wind variation 0-17 m.p.h.

On Friday, Vickers, Bristol, and Blériot pupils out. *Brevet* tests in good style on Bristol biplanes by Messrs. L. Gresley (altitude 450 ft.), and Lieut. B. E. Smithies (altitude 700 ft.; this pupil of Mr. Merriman's came back from Salisbury specially to take ticket). Mr. Jones on D.F.W., Mr. Alcock for two cross-country trips on 100 h.p. Sunbeam, Messrs. Barnwell and Knight on Vickers biplanes, Mr. Busted on new Bristol armoured "Scout," engine test of Martinsyde monoplane, on which Mr. Skene, its new pilot, afterwards made a flight; in the afternoon, Lord Carbery on his Bristol "Scout" to Hendon, followed by Mr. Alcock on the 100 h.p. Sunbeam, Mr. Mahl giving instructions to his pupil, Mr. MacGordon, on the 80 h.p. Sopwith, the pupil having sole control of machine and doing good banked turns and landings, Mr. Serge de Bolotoff taxiing his triplane, Mr. Hawker on the 100 h.p. Sopwith, and Mr. Wilberforce on the 45 h.p. Anzani-Blériot. Vickers, Bristol, and Blériot pupils out. Wind variation 0-17 m.p.h.

Bristol, Blériot and Vickers pupils out on Saturday morning. Mr. Skene on Martinsyde, Mr. MacGordon taxiing on the 80 h.p. Sopwith, Mr. Mahl with passenger on the 80 h.p. Sopwith, Mr. Gower on 50 h.p. Blériot, Mr. Hawker to Hendon on 100 h.p. Sopwith, Mr. Merriam on the Bristol biplane, Mr. Mahl to Hendon on 80 h.p. Sopwith, returning with two passengers, arrival of another Sopwith "Scout." In the afternoon scouting operations in connection with the great Red Cross demonstration were carried out by Messrs. Barnwell (Vickers gun 'bus), whose gunner helped to demoralise the "enemy," Messrs. Gower and Wilberforce (Blériot monoplanes), and Mr. Mahl on the 80 h.p. two-seater Sopwith biplane. Mr. Barnwell flew to Elstree and back via Hendon, giving gun-firing demonstrations at each place. Mr. Hawker returned from Hendon, and gave a very fine looping display which was much appreciated and heartily applauded by the many thousands gathered at Brooklands for the Red Cross demonstration.

On Sunday, Mr. Alcock back from Hendon in 35 mins. against wind, on the 100 Sunbeam, Mr. Goodden on the looping Morane, Mr. Barnwell with passenger on Vickers gun 'bus, Mr. Mahl



Lieut. Gerald G. Carpenter, 1st Suffolk Regiment, who recently took his *brevet* at the Grahame-White School at Hendon.

passenger carrying on 80 Sopwith, including the winner of the ballot for the free passenger flight, Mr. C. Rowe, of Willey Park, Broseley, Salop, who is at present a patient at Woking Hospital after a recent motor smash! Another magnificent looping demonstration by Mr. Hawker on the 100 Sopwith.

For the June Aeroplane Handicap on Saturday a large entry has been received, amongst the competitors being Mr. Hawker (100 h.p. Sopwith, Mr. Pixton (80 h.p. Sopwith "Scout"), Mr. Barnwell (100 h.p. Vickers gun 'bus), Mr. Knight (100 h.p. Vickers gun 'bus), Mr. Skene (Martinsyde monoplane), Mr. Gower (50 h.p.

Blériot), Mr. Alcock (100 h.p. Sunbeam), Mr. Elsdon (70 h.p. Vickers biplane), Mr. Webb (50 h.p. Vickers biplane), Mr. Stutt (50 h.p. Bristol biplane), Mr. Glew (45 h.p. Perry-Beadle biplane).

Mr. Kny, accompanied by Mr. Dukinfield Jones, has gone over to Germany, for the purpose of testing a number of D.F.W. machines and selecting some for dispatch to Brooklands.

Arrangements have been made for Mr. Hawker to give a looping display during the afternoon next Saturday.

Bristol School.—Monday, last week, as passengers: Mr. Treloar (3 flights), Mr. Charlesworth, Mr. Rutledge and Mr. Adamson. Solos by Mr. Gresley (2), Mr. Chambers and Lieut. Nugent.

Tuesday, passenger tuition to: Lieut. Nugent (3), Capt. Napier (3), Mr. Lucas (2), Capt. Bernard (2), Lieut. Richards (2), Mr. Godwin (5), Mr. Adamson (4), Mr. Rutledge (2), Mr. Charlesworth (2), and Mr. Treloar (5). Solos were made by Lieut. Richard, Lieut. Nugent, Mr. Chambers (2) and Mr. Gresley (2).

Wednesday, as passengers: Capt. Bernard, Capt. Napier (4), Lieut. Nugent (2), Mr. Lucas (4), Lieut. Coles (6), Mr. Treloar (9), Mr. Charlesworth (6), Mr. Rutledge (6), Mr. Adamson (7), Mr. Godwin (9). Solos by Mr. Gresley (2), Mr. Chambers (2), Lieut. Nugent and Lieut. Richard.

Thursday, passenger tuition to: Mr. Treloar (5), Capt. Bernard, Mr. Charlesworth (2), Mr. Rutledge (2), Lieut. Smythies, Mr. Adamson (3), Mr. Goodwin (5).

Friday, as passengers: Capt. Bernard (3), Capt. Napier (3), Mr. Lucas (2), Lieut. Coles (2), Mr. Goodwin (6), Mr. Adamson (7), Mr. Rutledge (4), Mr. Charlesworth (3), Mr. Treloar (8). Solos were made by: Lieut. Nugent (3), Lieut. Richard (3), Mr. Rutledge, Mr. Adamson and Mr. Charlesworth.

Saturday, passenger tuition to: Mr. Adamson (3) and Mr. Goodwin (4).

Vickers School.—Monday, last week, with instructor, Capt. Kane, Lieuts. Clemson and Warrant. Mr. J. Parker solo.

Tuesday, with instructor, Capt. Kane, Lieuts. Clemson and Warrant, and Mr. Klingenstein. Lieut. Eberli and Messrs. Miller and Parker solos; Mr. Klingenstein solo.

Wednesday, with instructor, Lieuts. Warrant and Clemson and Capt. Kane, Lieut. Gillman and Mr. Klingenstein. Lieut. Eberli and Messrs. Miller and Parker solos.

Thursday, with instructor, Capt. Kane, Lieuts. Gillman, Warrant and Clemson. Mr. Parker solo, and for *brevet* in excellent style.

Friday, with instructor, Lieuts. Clemson, Warrant and Eberli; Capt. Kane, Lieut. Eberli and Mr. Miller solos. Lieut. Gillman with instructor.

Saturday, with instructor, Capt. Kane, and Lieuts. Clemson and Gillman.

Liverpool Aviation School, Waterloo.

ON June 13th and 16th, Osborn-Groves rolling. On the Tuesday Melly tried Isaacson engine on the two-seater, but found weather tricky and came in.

Wednesday, Groves rolling. Later, Melly made three flights of 10 mins. each to Altcar and back, taking Groves and Isaacson on the last two flights respectively, and reaching 1,200 ft. in 5 mins.

Thursday, Groves was out rolling long straights of a mile each in perfect style, and on Saturday last Groves again doing excellent rolls, and put in a couple of perfectly correct hops of over 20 yards each. A strong N.W. wind has prevailed since Sunday.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Tuesday, last week, Messrs. Shepherd, Palmer and Courtney straights with Instructor Lillywhite.

Wednesday, Messrs. Liu, Wyles, Palmer, Shepherd, Courtney, North and Gruning straights with Instructors Birchenough, Howarth and Lillywhite. Messrs. Dunne, Lowe and Robinson solo circuits and figures of eight.

Thursday, Messrs. Robinson, North and Dunne figures of eight, &c., Messrs. Palmer, Liu, Gruning, Courtney and Shepherd straights with Instructors Barrs and Lillywhite.

British Caudron School.—Monday and Tuesday last week, too windy for the school to go out.

Wednesday, school out at 5.30 a.m. under the instruction of W. T. Warren and Rene Desoutter. W. T. Warren tested new machine, finding same in good trim. R. Desoutter flight, Mrs. Buller flight. Mr. Macgregor two straights on new machine. W. T. Warren gave Mr. T. W. Abbott his first lesson; after being on machine for one hour Mr. Abbott succeeded in getting straight across to mark and back. At 6.30 p.m. W. T. Warren flight. Rene Desoutter flight, reaching to a height of 1,200 ft. on 35 h.p. new machine.

Thursday, at 4.30 a.m. under the instruction of W. T. Warren and R. Desoutter. Had to wait for fog. Mr. Abbott rolling and progressing favourably, getting in good hour's practice. Too foggy for other work.

Friday, school out at 7 o'clock, having to wait owing to fog. W. T. Warren test flight. R. Desoutter flight. Mrs. Buller two flights, Mr. Abbott had good practice in rolling, will soon be ready for flights.

Hall School.—Tuesday, last week, A. F. Arcier, H. Gearing, and A. L. Brookes on Caudron. J. L. Hall on Avro.

Wednesday, H. Gearing, A. F. Arcier and A. L. Brookes eight straights each on Caudron, too windy for circuits. Messrs. Gibson and Charig straights on Deperdussin monoplane. Miss D. Clifford on Avro with dual control.

Thursday, Messrs. A. L. Brookes, A. F. Arcier circuits and figure eights on dual control Avro. Later, Mr. Hall took up Messrs. Haines and Gibson as passengers, 10 mins. each.

Friday, Messrs. A. F. Arcier and A. L. Brookes on No. 1 Caudron in morning and evening. Owing to terrific thunderstorms during day flights were compelled to be brief.

Saturday, windy, J. L. Hall exhibitions and passenger carrying on Avro.



Mr. J. L. Hall takes Miss Elsie Spencer, who is so successfully appearing in the "Marriage Market" at Daly's Theatre, for a flight at Hendon on his 50 h.p. Avro.

LONDON-MANCHESTER-LONDON AIR RACE.

DESPITE the fact that out of eight starters in last Saturday's race from London to Manchester and back only three finished, it was nevertheless an interesting and historic race. There was a little of the sensational about it, too, for it was won by the winner of the recent Aerial Derby, W. L. Brock, the popular hero of the race whom many hoped would win. Excellent as Brock's performance was, as will be seen later, Carr and Alcock, who finished second and third respectively, also put up most creditable attempts to win the race, the former because he was making his first big flight on a fast monoplane—the Morane-Saulnier—and the latter on account of his being delayed nearly an hour at the start by slight engine trouble and encountering a storm on his return which the others missed.

On the day before the race, Friday, several of the competitors made speed trials at Hendon in order to provide the necessary data for the handicappers, Mr. George Reynolds and Mr. J. H. Ledeboer. The pilots were J. Alcock, W. Birchenough, P. Bjorklund, W. L. Brock, Lord Carbery, R. H. Carr and Louis Noel, and each flew three times each way over a distance of about a quarter of a mile. Lord Carbery on his 80 h.p. Bristol scout attained a speed of over 100 m.p.h.

Early on the Saturday morning at Hendon, prospects looked far from favourable, for a thick mist rendered it impossible to see further than half a mile or so away, and as the time for the start approached, matters did not improve very much. As, however, reports of clear weather were received from points all along the route beyond St. Albans, it was decided to dispatch the first competitor at 9.30 a.m. At this hour, therefore, the limit man, W. Birchenough, on the 70 h.p. Maurice Farman, started off on the first stage of 91 miles to Birmingham, with a mechanic as passenger, and was soon lost to view in the mist. The next pilot to start should have been Bjorklund on the 50 h.p. Blériot, but he was unable to do so owing to indisposition. Shortly before his time to start, J. Alcock made a test flight on the 100 h.p. Sunbeam-Maurice Farman, but he had not made more than half a circuit when the engine stopped suddenly, and he had to descend at the far end of the aerodrome eight minutes before he was due to start. A hole in the carburettor float was the cause of the trouble, so the float was taken to the Grahame-White works to be set right. In the meanwhile L. A. Strange was sent off on the 80 h.p. Blériot, and he also soon disappeared in the mist. Lord Carbery then made a test flight on his 80 h.p. Bristol, during which he flew into a fog bank

about 500 ft. up. By this time Alcock's engine was got going again, and at 10.55.40 he started off, carrying Harold Lane as passenger and course finder. Conditions were then improving somewhat, and it was hoped that Hawker on the 100 h.p. Sopwith, R. Skene on the Martinsyde, and perhaps Gordon Bell on the Avro would be able to come over from Brooklands, where it was stated the weather was very bad. Louis Noel, W. L. Brock, and R. H. Carr were then dispatched at short intervals on the three Morane-Saulniers, each getting away in fine style. They had not been gone long when a machine was seen returning, which proved to be Birchenough's Maurice Farman. On landing he stated that he had covered about 50 miles, but had to return owing to the petrol tank leaking very

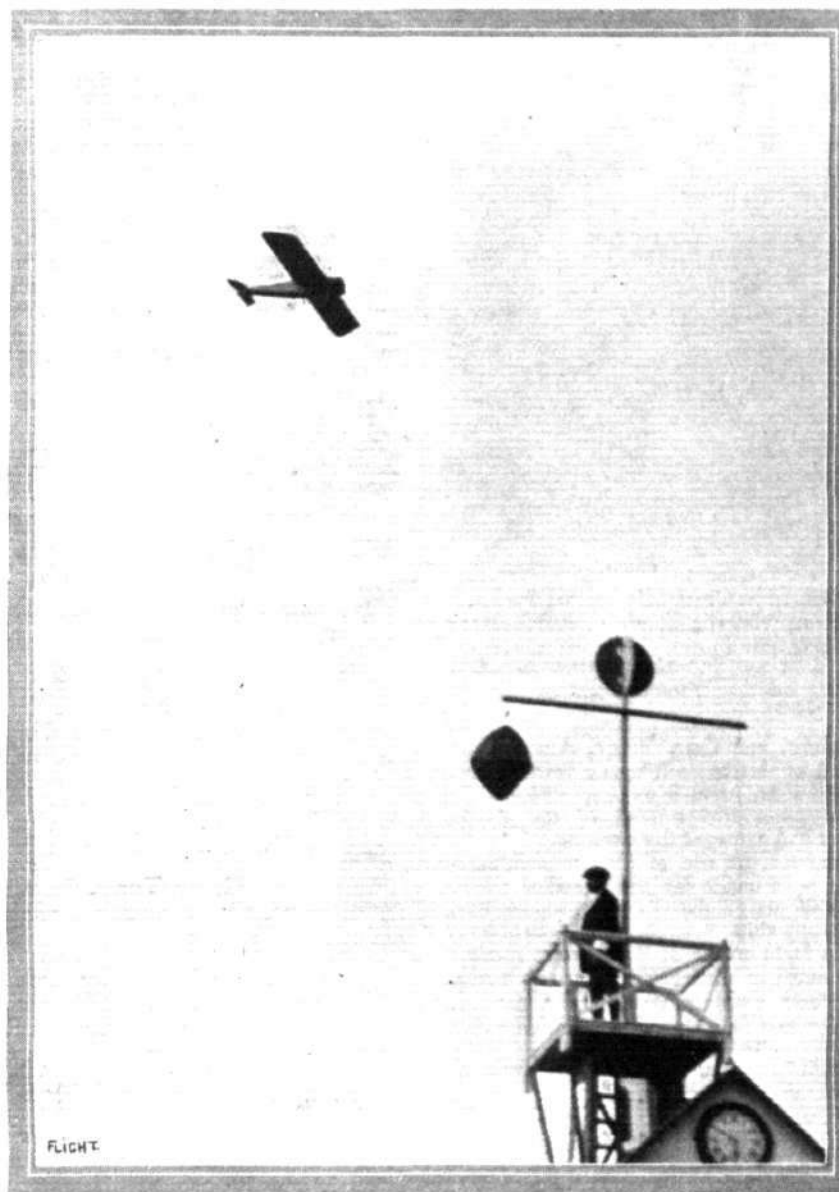
badly. He reported the weather as being quite good 20 miles out. Shortly after Birchenough's return, Victor Mahl arrived from Brooklands with a passenger on the 80 h.p. Sopwith "family 'bus," and reported that conditions were very bad all the way from Brooklands, and that Hawker, on the 100 h.p. Sopwith Tabloid, had ascended to see what the prospects of coming over were like as he left. Hawker arrived a few minutes later with news that Skene was not coming.

Lord Carbery got away next, Hawker following some 25 mins. after, so that out of the fourteen entrants eight had started—one had already returned—leaving six non-starters, viz.:—Bjorklund, R. J. Lillywhite on the G.-W. tractor, P. Verrier, who flew to Manchester on the Maurice Farman the day before in order to give exhibitions at that place, R. Skene on the Martinsyde, and the Avro and Henry Farman biplanes. Now that all the competitors were away, news was anxiously awaited for their arrivals at Birmingham and Manchester, and one's fancy turned to thoughts of lunch.

During the latter, J. L. Hall ascended on his 50 h.p. Avro—with "Pratts" written as large as life on the under side of the lower planes—and Mahl returned to Brooklands. At 1.40 p.m. Hawker returned to the aerodrome, much to everyone's surprise, and got

out of his machine in a very dazed condition. He stated that he got as far as Coventry, where he lost his bearings in a fog, and, feeling ill, decided to return to Hendon.

How he found his way back he did not know, he said, and then feeling bad again he was taken to the aerodrome offices to rest. This was, perhaps, the one tragedy of the race, for he was the favourite, and stood an excellent chance to win. News of the other competitors then came trickling in. Strange had arrived at



"Flight" Copyright.

LONDON-MANCHESTER-LONDON RACE.—Finish by Brock on his Morane-Saulnier machine on Saturday last, when he won this race in magnificent time. The time estimated by the handicapper for him to arrive back at Hendon was 5.50 p.m., and within ten seconds of that time Mr. Brock passed the winning post. Note the clock in our photograph, which points exactly to the 5.50.



"Flight" Copyright.

Mr. Winston Churchill with Mrs. Churchill visited Hendon on Saturday last in connection with the London-Manchester-London Race. Our photograph shows Mr. Churchill in conversation with Mr. Richard T. Gates, the General Manager of the London Aerodrome.

and departed from Birmingham, and Carr, Brock, Alcock, and Lord Carbery had also arrived at this control, but no news of Noel came to hand until some time after, when it was reported that he had landed on Birmingham racecourse instead of the Castle Bromwich Playing Fields, and had damaged his machine.

By now it was 3 o'clock, and for the rest of the afternoon exhibition and passenger flights were made by the Hendon pilots. A. E. Barrs made numerous flights on the G.-W. bi-rudder 'bus, and N. Howarth and R. J. Lillywhite flew the same machine as well. Lillywhite also made a flight on the G.-W. tractor "Lizzie," on which he seemed to be as much at home as on one of the 'buses. The petrol tank of the Maurice Farman having been mended, Birchenough made several passenger flights on this machine, whilst E. F. Norris came out on 'bus No. 107. J. L. Hall put up a fine high flight on his Avro, ascending to an altitude of about 5,000 ft., where he disappeared amongst the clouds from time to time. During these flights H. Barnwell passed over the aerodrome on the 100 h.p. Vickers gun-biplane on his way from Brooklands to Elstree, passing over again a little later on and returning to Brook-

lands. At 5 o'clock a speed contest for a trophy presented by Mr. A. Oddenino was flown in a single heat over six laps of the aerodrome. There were four starters, as follows:—E. Baumann on the 50 h.p. Gyro-Wright (2 mins. 26 secs.); N. Howarth on a 50 h.p. G.-W. 'bus (2 mins. 6 secs.); R. J. Lillywhite on the 50 h.p. G.-W. bi-rudder 'bus (1 min. 20 secs.); and W. Birchenough on the 70 h.p. Maurice Farman (scratch). Howarth and Lillywhite retired after completing four laps, leaving Baumann and Birchenough to finish. Baumann kept ahead until the end of the last lap, when he was overhauled by Birchenough, who crossed the line three seconds in front. Birchenough completed the course in 13 mins. 32 secs. and Baumann in 13 mins. 35 secs. Immediately after the race Barnwell passed overhead once more, and returning shortly after swooped down into the aerodrome and flew past the enclosures, the gunner firing several rounds of "blank" from the quick-firer, much to the astonishment of the spectators. Mr. Winston Churchill, who was busy examining the various machines, also witnessed this performance.

In the meanwhile news was received that Brock, Carr, and Alcock had arrived at and departed from Manchester, and that Strange, who was the first to arrive at this control, had smashed his propeller and a chassis strut when starting on the homeward journey and had been compelled to retire, whilst Lord Carbery had damaged his machine on landing at Birmingham and had also retired. Shortly after 5 o'clock it was announced that Brock had left Birmingham for Hendon and might be expected at about 6 o'clock, and sure enough, at a quarter to, a machine was seen above the trees in the north-west, followed by a cry of "there he is." There was no doubt about it being a Morane-Saulnier, but it was not until it arrived over the aerodrome that we saw it was Brock's. He crossed the line at 5.49.6, 10 seconds sooner than the time calculated for his arrival by the handicappers. Needless to say he was given an enthusiastic reception, and was chaired to a car which carried him past the various enclosures to "exhibit" him to the spectators.

His progress throughout the race was without incident except that he ran into fog on the last part of the first stage, when he landed in a field and ascertained from some farm hands that he was only some 14 miles from Birmingham. He got one of the farm hands to swing the propeller, and was soon on his way to Birmingham,

RESULTS OF LONDON-MANCHESTER AND BACK AIR RACE.

Daily Mail Gold Trophy and "Pratt's" £400.

W. L. Brock (80 h.p. Morane-Saulnier monoplane).

Handicap for 1st Prize (£250) and 2nd Prize (£100).

Presented by the Anglo-American Oil Company.

	Handicap Time.	Flying Time.	Average Speed.
	h. m. s.	h. m. s.	m.p.h.
1. W. L. Brock ...	6 19 6	4 42 26	69
2. R. H. Carr ...	7 35 54	5 56 12	54
3. J. Alcock ...	8 32 11	7 56 17	45

Flying Times Between Controls.

	Hendon- Birmingham.	Birmingham- Manchester.	Manchester- Birmingham.	Birmingham- Hendon.	Total.
	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.
W. L. Brock	1 36 59	0 48 39	1 6 12	1 10 36	4 42 26
R. H. Carr...	1 29 30	1 19 36	1 50 40	1 16 26	5 56 12
J. Alcock ...	2 50 49*	1 7 22	2 9 17	1 48 49	7 56 17

* Including delay at Hendon.

LONDON-MANCHESTER AND BACK AIR RACE, JUNE 20th.—Handicaps and Times of Competitors.

Pilot.	Machine. bi = biplane. m = monoplane.	Engine.	Handi- cap.	Starting Time.	BIRMINGHAM.		MANCHESTER.		BIRMINGHAM.		HENDON Arrive.
					Arrive.	Depart.	Arrive.	Depart.	Arrive.	Depart.	
W. Birchenough	Maurice Farman bi.	h.p.		h. m. s.	h. m. s.		h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.
P. Bjorklund ..	Blériot m. ...	70 Renault	2 50 32	9 30 0							
J. Alcock ...	Maurice Farman bi.	50 Gnome...	2 30 22	9 50 10							
L. A. Strange ...	Blériot m. ...	100 Sunbeam	2 14 38	10 5 54*	12 56 43	1 26 43	2 34 5	3 34 5	5 43 22	6 13 22	8 2 11
Louis Noel ...	Morane-Saulnier m.	80 Gnome...	1 51 44	10 28 48	12 7 49	12 37 49	1 50 0	Damaged machine on leaving Manches-			
W. L. Brock ...	" "	80 "	1 17 10	11 3 22							
R. H. Carr ...	" "	80 "	1 13 52	11 6 40	12 43 39	1 13 39	2 2 18	3 2 18	4 8 30	4 38 30	5 49 6
Lord Carbery ...	" "	80 "	1 10 50	11 9 42	12 39 12	1 9 12	2 28 48	3 28 48	5 19 28	5 49 28	7 5 54
H. G. Hawker	Bristol bi. ...	80 Le Rhone	0 24 42	11 55 50	12 57 20	Damaged machine on landing at Birmingham.					
	Sopwith bi. ...	100 Gnome...	scratch	12 20 32							

* Actually started at 10 h. 55 m. 40 s.

which he reached safely. After a stop of exactly the half hour, he resumed his journey to Manchester, completing the distance of 70 miles in 48 mins. 39 secs. At Manchester he stayed no more than the necessary hour, and the homeward journey was accomplished without difficulty—to use his own words, the last half of the journey was a joy ride. He did not see any of the other competitors whilst in the air, and throughout the race he maintained an average altitude of from 1,000 to 1,500 ft. It is rumoured that he owed his success to his chewing gum.

The next man home was Carr, who, it will be remembered, also scored in the Aerial Derby, he being second. He crossed the line at 7.5.54, just over an hour after Brock. Carr was less fortunate than Brock in finding his way, and had to land at Aylesbury to ascertain the direction of Birmingham, which he eventually reached a few minutes in front of Brock. He also missed his way just outside Manchester, mistaking the Bridgewater Canal for the Manchester Ship Canal, and he was seen by the observers at Trafford Park hovering about for some time before he at last located his correct direction. Carr received an equally warm reception on landing at Hendon, and after shaking off the numerous interviewers and well-wishers he retired to the tea pavilion with a small party of Hendonites there to partake of a well-earned meal. Shortly after 8 o'clock Alcock arrived on the Maurice Farman propelled by the only British engine in the race—a Sunbeam. Alcock and his passenger had plenty of excitement throughout the race, especially during the stages between Birmingham and Manchester

where they experienced very bumpy weather, whilst on the homeward journey they got into the thick of a storm. It was indeed hard luck on Strange to be put out of the race in the way he was, for he made excellent progress as far as he got. Except that he could not locate the Birmingham control, to which he was guided by Claude Grahame-White, who ascended from the ground on the Henry Farman on which he had been giving exhibitions, he steered an absolutely true course throughout, and did not lose a second at the controls.

Large crowds witnessed the arrivals and departures of the competitors at Birmingham and Manchester. At the former control C. Grahame-White made numerous exhibition and passenger flights on the 80 h.p. Henry Farman, and after Noel, with his usual bad luck, was put out of the race, this pilot also amused the crowd on the same machine. The crowd at Manchester was kept amused during the long waits in a similar manner, for P. Verrier made many flights on the 70 h.p. Maurice Farman, which he had flown over the day previous. He took up no fewer than 22 passengers, including the Lord Mayor of Manchester, in addition to executing many of his daring stunts. At 5 o'clock he left, with his mechanic as passenger, for Hendon *via* Birmingham, arriving at the latter place at 6.30 p.m., and leaving 20 minutes later he arrived at Hendon at 8.45 p.m. His arrival was extremely picturesque, for he was at an altitude of about 2,000 feet, from which height he made a fine spiral *vol plané*, the machine standing out prominently against the beautiful sunset sky: it was indeed a peaceful and grand finish to a long and exciting day.

FLYING AT HENDON.

THURSDAY afternoon of last week was fine and sunny, and some good flying was witnessed by an appreciative gathering. The proceedings opened shortly before 3.30 p.m. with a passenger flight by W. Birchenough on the Maurice Farman, R. J. Lillywhite on the 50 h.p. G.-W. bi-rudder 'bus, and Rene Desoutter on a re-built 35 h.p. Caudron. Lillywhite terminated his flight with several pretty spirals with the engine stopped. Rene Desoutter made the little Caudron climb at an astonishing rate considering the small power.

Birchenough on the Maurice Farman, Lillywhite on the bi-rudder 'bus, and R. H. Carr on the 80 h.p. Blériot then started a series of passenger flights, taking up between them about ten. N. Howarth also gave exhibitions on the bi-rudder 'bus, on one occasion executing some "zig-zags" to the alarm of some of the spectators who thought that the machine was out of control. J. L. Hall made several flights on his 50 h.p. Avro, and P. Bjorklund and Louis Noel, two of the competitors in the London-Manchester race, made test flights on the 50 h.p. Blériot and 80 h.p. Morane-Saulnier monoplanes respectively.

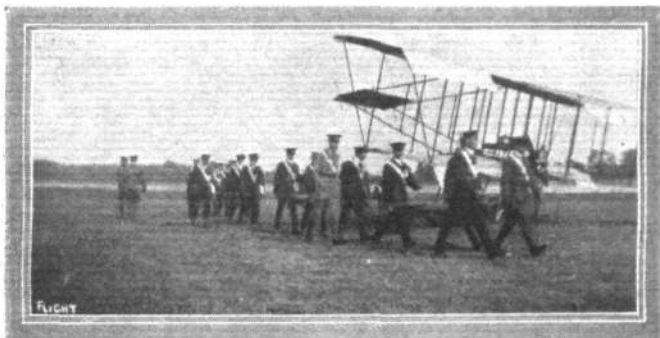
Pierre Verrier apparently "went mad" on a 70 h.p. Maurice Farman, and performed all kinds of stunts, including flying up and down the enclosures standing on the seat with one arm resting on the top plane! Later in the afternoon Carr gave a looping demonstration on the 50 h.p. G.-W. tractor biplane "Lizzie," making two loops, each at a height of about 800 ft. Other flyers out during the afternoon were E. Baumann on the 50 h.p. Wright, W. L. Brock on the 80 h.p. Blériot, and Louis Noel on the Maurice Farman.

Ascot Sunday at Hendon was, as it should be, quite bright and gay, and a large attendance witnessed some excellent flying. The winner of the previous day's race, W. L. Brock, made a magnificent altitude flight above the clouds, on his Morane-Saulnier, reaching a height of 9,000 feet. R. H. Carr gave two looping demonstrations, executing two loops each time at about 1,000 feet. Claude Grahame-White took up Lady Muir-Mackenzie on the Maurice Farman, and W. Birchenough and Louis Noel also carried several passengers on the same machine. Other Hendon pilots, J. L. Hall on his Avro, A. E. Barrs on the G.-W. 'bus, &c., also contributed towards the afternoon's amusement.

EDDIES.

BROOKLANDS was the scene, on Saturday last, of great activity, though of a different kind from that which usually takes place there. Posters along the footpath from Weybridge station to the entrance gates announced a

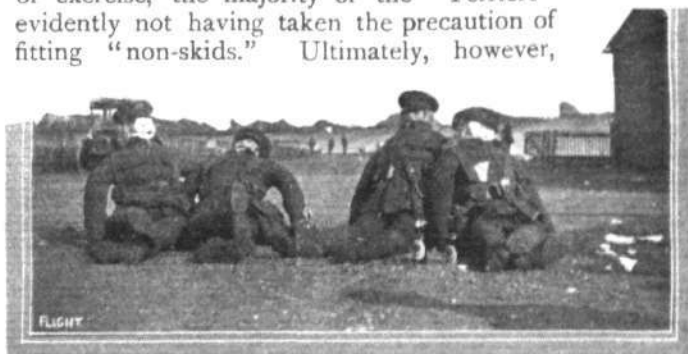
Army scramble up the steep parts of the race track, the surface of which was obviously not designed for this sort of exercise, the majority of the "Terriers" evidently not having taken the precaution of fitting "non-skids." Ultimately, however,



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The ambulance off to pick up "wounded" soldiers on Red Cross Day at Brooklands.

Red Cross Field Day, and a Red Cross Field Day it was. The slopes around the paddock and test hill were covered with Red Cross hospitals and tents, whilst Territorial troops livened things up by conducting a fierce "battle." It was amusing to watch a division of the defending



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"Wounded warriors" awaiting the arrival of the ambulance on Red Cross Day at Brooklands. These straw dummies were left lying on the grass and aeroplanes sent out to locate them and bring back reports as to their whereabouts.

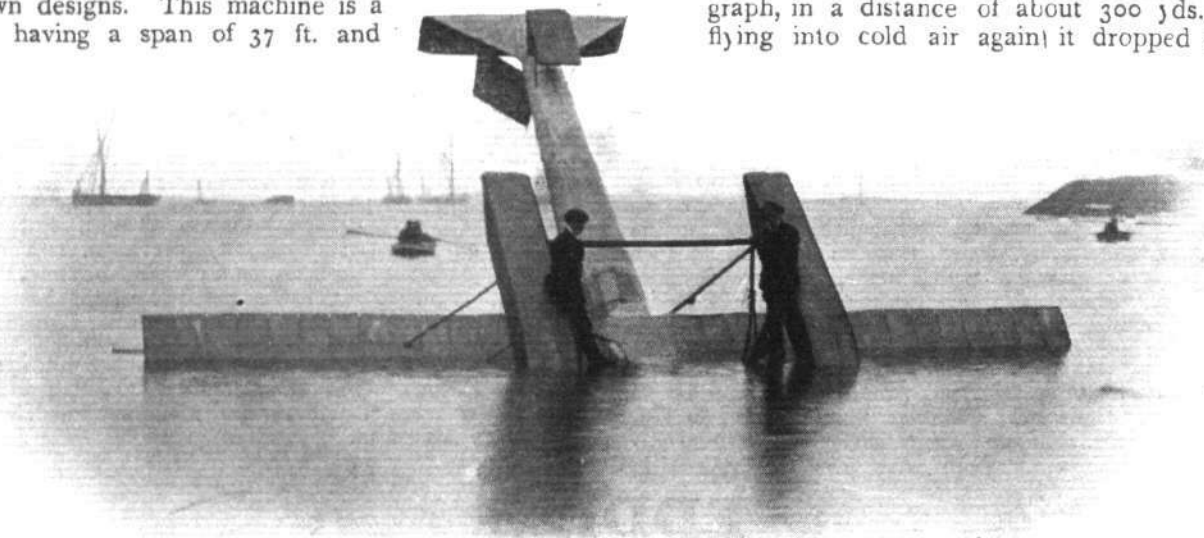
the top of the track was reached and from here a deadly hail of wax bullets were rained down on an imaginary enemy.

Mr. Barnwell, on the Vickers gun-carrying biplane, went out over the surrounding country to locate the

enemy, and his passenger did his level best to kill off as many of the "invaders" as possible with the machine gun which was mounted in the nose of the *nacelle*. Later Barnwell must have regretted his part of the manslaughter for he went out again to look for "wounded," and after locating them brought back information as to their whereabouts, and thus probably saved many lives by enabling the field ambulance to render prompt assistance. Among the large and distinguished company which watched the proceedings during the afternoon were H.M. Queen Alexandra and the Dowager Empress of Russia, this being the first visit of a member of the British Royal Family to the track. Numerous flights were also made during the afternoon by Messrs. Mahl, Gower, Wilberforce, and several other pilots. In the evening Hawker arrived from Hendon, and delighted everybody by looping in excellent style.

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Waterplaning is not, evidently, to be regarded as the sport of the well-to-do, as I hear that the three brothers Mitchell are having an excellent time at Gillingham in Kent, with a machine which they have constructed from their own designs. This machine is a biplane having a span of 37 ft. and



The Mitchell hydro-aeroplane after overturning in the Medway at Gillingham.

34 ft. for the upper and lower planes respectively—the chord being 4 ft. 6 ins. and the gap 6 ft. At present a 100 h.p. Mors engine is fitted, and the machine when empty weighs 1,050 lbs. Three floats are employed—two main and one tail float—the former, which weigh 50 lbs. each, being rigidly attached to the struts from the body, and tied together by the cross-member seen in the photograph. *Ailerons* are fitted between the main planes.

The machine has not yet been flown, owing to the fact that the locality is within one of the restricted areas, but "taxying" has been freely indulged in. On the last occasion, however, misfortune awaited them, happily without serious results, as the crowd, holding on to the tail, let go before the pilot was ready, with the result depicted in the photograph.

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The Perry Beadle tractor biplane is now erected at Brooklands and has been out for a short "straight." This machine, which is quite a likely looking little "bus," will be more thoroughly tested as soon as weather conditions permit, and should prove attractive to the amateur pilot as the selling price is to be very reasonable indeed.

The flying boat exhibited at Olympia by this firm is practically finished and will, it is expected, be tested shortly, probably at Cowes.

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As a result of his exhibition flights at Scunthorpe, Lincs., Manton's collection of mascots has received two interesting additions. One is a silver-mounted hazel nut, the nut having been discovered 70 ft. below the bed of the River Trent whilst laying the foundations of a new railway bridge. The only speech made by the donor in handing over the gift was: "A nut from a knut to a knut." The other is a miniature silver replica of the famous Lincoln Imp.

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Whilst at Scunthorpe Manton, after some difficulty, obtained permission to inspect some of the local iron-works, and impressed by the heat from the furnaces, the thought occurred to him that it would be interesting to try a flight over the works in order to watch the behaviour of the machine in the heated air. Next morning he went up for the purpose, and as he was passing over the works the Blériot rose up about 50 ft., according to his barograph, in a distance of about 300 yds., and on flying into cold air again it dropped a similar

distance. Although it was more or less what he expected, Manton tells us it was an uncanny experience, as it felt as though the machine was being lifted by an invisible crane.

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One amusing experience befell Manton on the first day at Scunthorpe. On landing from a flight he was approached by a gentleman who asked in German if he spoke that language. In the same language Mr. Manton just managed to inform him that he did not. The stranger then tried French. Again Mr. Manton had to express his regrets for a limited knowledge of that tongue. The man next tried Spanish, and finally in desperation spoke some English, and was considerably surprised to learn that the young airman who had been giving such clever demonstrations was just an Englishman.

Manton also tells me, with a twinkle in his eye, of the comment of one of the crowd who evidently knew that his father is a doctor. When Manton disappeared among the clouds and someone asked where he had gone the answer came back, "I suppose he has gone to see some of his father's old patients."

Mr. Oswald Watt, writing from the Blériot Aerodrome at Buc, reminds me that two old friends are over there at present. Maurice Tetard (ex Bristol) is flying the biplane fitted with a Doutre stabilizer in the stability competition, while Sabelli is taking delivery of three tandem Blériots for the Bulgarian Army. Tetard hopes to be in England in a few weeks, demonstrating a Bathiat-Sanchez biplane.

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Mr. Summerfield, of Melton Mowbray, who has recently been flying the Watson rocking wing machine at Buc, had a narrow escape whilst flying his Blériot monoplane recently. He was coming down in a steep spiral, and, when trying to flatten out at a height of about 50 ft., found that one of his rudder control wires had come adrift, thus rendering the rudder useless. Taking his feet off the rudder bar and placing them on the tank he awaited the smash. The machine struck the ground with great force and was totally wrecked, but Mr. Summerfield escaped practically unhurt. He is of the opinion that had he kept his feet on the rudder bar he would have broken his legs.

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First the Derby and now the London-Manchester flight! Hearty congratulations, Brock! But if you persist in this sort of thing we shall have all the other pilots retiring from racing. Nevertheless, I don't think anybody begrudges you your victory, for we all know that you have worked hard and persistingly.

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Mr. V. Waterfall, who has for some time past been piloting the Martinsyde monoplane at Brooklands, has now joined the Royal Flying Corps. The Martinsyde firm have secured the services of Mr. R. R. Skene, who will in the future pilot their machines.

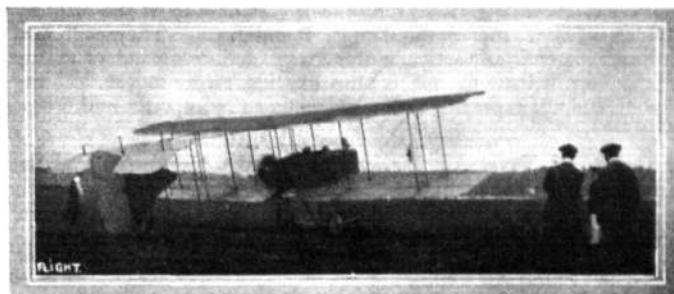
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It is probable that more will be heard of the Shoreham aerodrome in the future than has been the case in the past, for I learn that it is now under new management, and gather that it is intended to make an endeavour to hold weekly race meetings, including cross-country races and pylon races, as well as other exhibition flights. Several well-known pilots have promised to lend assistance by taking their machines down to Shoreham, either permanently or on race days. I wish the management the best of luck in their undertaking.

Mr. Dukinfield Jones left for Germany on Saturday last and will bring back with him one of the new small fast D.F.W. scouting biplanes. It will be interesting to see how this machine compares with the other fast scouts.

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Congratulations to Prof. G. H. Bryan, Sc.D., F.R.S., to whom the Council of the Aeronautical Society of Great Britain announce that they have awarded the gold medal of the Society for the great services he has rendered to aeronautics by his development of the theory of the stability of aeroplanes. As long ago as 1903 Prof. Bryan, in conjunction with Mr. Ellis Williams,



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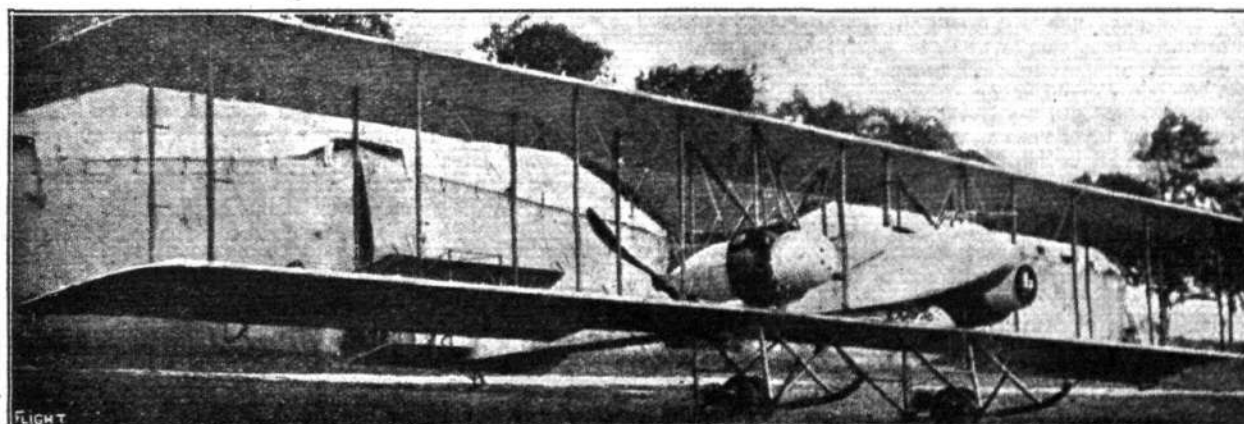
Mr. Barnwell testing his engine before making a flight in the Vickers gun-carrying biplane at Brooklands.

communicated to the Society a paper on "The Longitudinal Stability of Aeroplane Gliders." The previous recipients of the gold medal of the Society were Wilbur and Orville Wright, 1909, and Octave Chanute, 1910.

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The visit of B. C. Hucks to Cardiff last week-end was not without its incidents, and one of them, which occurred on Thursday, was none too pleasant. He was spiralling down from a good height on the two-seater, and had reached about 500 ft., when his foot slipped on the rudder bar. The machine started side-slipping, then nose-dived, and dropped 300 ft. before Hucks regained control. On Saturday whilst starting out of the ground on one occasion Hucks flew clean through two telephone wires, but fortunately the only damage done was a few scratches on the propeller. Later in the afternoon Hucks took a lady to Caerphilly Mountains, and had the novel experience of watching his altimeter registering 2,000 ft. whilst the ground was only a couple of hundred feet below.

"ÆOLUS."



FRENCH ARMoured BIPLANE BUILT AT CHALAIS-MEUDON.—This new product of the French military aircraft factory has a tractor type fuselage, but is a propeller biplane having two 160 h.p. Gnome engines mounted in streamline casings in the manner shown in the accompanying photograph, and each driving a separate propeller. The front portion of the fuselage is armoured with 3 mm. thick steel plates, and a Hotchkiss machine gun is mounted in the extreme nose of the fuselage, a position which provides a very wide angle of action.

ROYAL NAVAL



The new badge.

AIR SERVICE.

THE RE-ORGANISATION SCHEME.

THE following regulations have been issued by the Admiralty which take the place of those provisionally issued in Admiralty Circular Letter No. 22 of July 15th, 1912. The Royal Naval Air Service will form part of the Military Branch of the Royal Navy, and the various ranks will be added to the list of officers of the Military Branch in Art. 169 of the King's Regulations. They will not, however, be entitled to assume the charge and command of a ship unless they belong to one of the existing ranks in the Military Branch and are expressly authorised to do so by superior authority.

A.—General Administration.

The Royal Naval Air Service, forming the Naval Wing of the Royal Flying Corps, will comprise all naval aircraft and personnel, either for active or reserve service, and will be administered by the Admiralty. It will consist of—

- The Air Department, Admiralty.
- The Central Air Office.
- The Royal Naval Flying School.
- The Royal Naval Air Stations.

All seaplanes, aeroplanes, airships, seaplane ships, balloons, kites, and any other type of aircraft that may from time to time be employed for naval purposes.

When Naval Air Stations are established at places on the coast where Coast Guard Stations exist, the Coast Guard duties will be taken over and performed by the officers and men of the Royal Naval Air Service. Until the Royal Naval Air Service is more fully developed such ratings as are necessary will be lent from the Coast Guard for these duties. All ranks and ratings of the Royal Naval Air Service will be borne on the books of one of H.M. Ships, and will serve under the provisions of the Naval Discipline Act accordingly. The Military Wing and its Reserve and the Central Flying School will be administered by the War Office. A portion of the staff of the Central Flying School will be drawn from the Naval Wing.

B.—Officers.

Applications for Enrolment.—Officers serving afloat who desire to join the Royal Naval Air Service should forward their applications through the usual Service channels. Officers of the Royal Marines serving at Headquarters will forward their applications through their Commandant. Officers of the Royal Naval Reserve or the Royal Naval Volunteer Reserve, when not serving afloat, should forward their applications through the Admiral Commanding Coast Guard and Reserves. Officers on the Retired and Emergency Lists, or on Half-Pay, should communicate direct with the Secretary of the Admiralty. The application must contain the following details:—(a) Age. (b) Whether married. (c) Whether desirous of joining for continuous or reserve service. (d) Any special qualifications. In all cases of application by officers serving afloat or at the Royal Marine Headquarters, the application must be accompanied by a recommendation from their Commanding Officer and by a medical certificate certifying as to their general medical fitness, especially with regard to eyesight and heart.

Applications for Enrolment by Civilians.—Civilians will be eligible for direct entry into the Naval Wing as officers under the terms of the special regulations on the subject. All such officers will be appointed as Flight Sub-Lieutenants, Royal Navy, on entry, but they will be on probation until they have qualified in all respects.

Selection.—Selections will be made by the Admiralty from time to time from the roster kept by the Air Department. Officers of the Royal Navy on the active list will not be eligible for selection until they have completed one year's service as commissioned officers, or in the case of warrant officers until they have received confirmation in their rank. Sub-Lieutenants will be required to possess their watch-keeping and engine-room certificates. Officers of the Royal Marines will not be selected until they have completed their courses.

Conditions of Service.—An officer* appointed to the Royal Naval Air Service, who has obtained or subsequently obtains the airship or aeroplane pilot's certificate of the Royal Aero Club at his own expense, will be refunded the sum of £75, or such lesser fee as he has been

* NOTE.—In cases where men of the Royal Naval Air Service have been granted permission to obtain their Royal Aero Club certificates privately, the above regulations will be applicable to them also.

charged for his tuition. Such payment will not be made until after a reasonable period of probation, and will depend upon a satisfactory report being received from the Commanding Officer under whom the officer is serving. Should he resign or retire within four years of the date on which he was selected, he will be liable to refund this sum, less one quarter such sum for every completed year of service. Full pay, with lodging allowance, &c., will be allowed to an officer already serving in the Royal Navy whilst obtaining his certificate at his own expense, provided that he has received permission from the Admiralty. All applicants who are selected will, as a rule, be required to graduate at one of the Royal Flying Corps Instructional Establishments before being appointed to the Royal Naval Air Service, and if there is no vacancy for them for active service after completing their course they may be placed in the reserve until a vacancy occurs. All officers in the Royal Naval Air Service will be liable to be detailed for any branch of the Service, i.e., Seaplane, Aeroplane, Airship, Seaplane Ship, or Kite work, or for constructional or administrative work in connection with aircraft in general, and they may be required to serve either afloat or on shore at home or abroad. In time of war they are liable to serve for either naval or military purposes. Every encouragement will be given to officers to make themselves acquainted with all branches of Air work. As soon as circumstances permit, it will be a general principle that airship officers are taken from those who have served in the other branches of the Royal Naval Air Service. The period of service in the Royal Naval Air Service for officers drawn from the active list, Royal Navy, must be limited by their flying efficiency, and will not, as a general rule, according to present experience, exceed a duration of four years, dating from the time of selection. A certain number will, however, be selected to fill the higher posts in the Air Service. Those officers who are not selected for these higher posts will return to their ordinary duties in the Fleet after the above period, but may be reappointed subsequently for further duty in the Air Service at the discretion of the Admiralty. Other officers will pass into the Reserve at the expiration of four years, unless their term of service is extended or renewed. On the completion of one year's service they may, if considered suitable, be permitted to extend their original engagement to a total of six years; after 4 years' service to 8 years; and after 6 years' service to 10 years; or alternatively they may be permitted to renew their engagement on its completion in the ordinary course. Any officer who at any time is found to be unfitted for the duties of the Royal Naval Air Service will be liable to discharge therefrom, and those officers who belong to other branches of the Royal Naval Forces may be required to revert to their ordinary duties. This will not necessarily indicate that any blame is attributable to the officer. Service of Naval Officers in the Royal Naval Air Service (not including the Reserve) will count in all respects as service in a ship of war at sea.

Rank in the Royal Naval Air Service.—Officers of the Royal Naval Air Service will be graded in the following ranks, and will take rank and command accordingly:—Wing Captain, with relative rank of Captain, R.N. Wing Commander, as Commander, R.N. Squadron Commander (when in command), as Lieutenant-Commander. Squadron Commander (when not in command), as Lieutenant over 4 years' seniority (but senior to all Flight Commanders). On attaining 8 years' seniority in the relative rank of Lieutenant these Officers will rank with Lieutenant-Commanders, R.N. Flight Commander, with relative rank of Lieutenant, R.N., over 4 years' seniority. Flight Lieutenant as Lieutenant, R.N. Flight Sub-Lieutenant, as Sub-Lieutenant, R.N. Warrant Officer, 1st Grade, as Commissioned Warrant Officer, R.N. Warrant Officer, 2nd Grade, as Warrant Officer, R.N.

Specialist Officers.—Officers employed on specialist duties, particularly gunnery, torpedo, or engineering, will be graded in the above ranks, and will be instructed in the special air work which concerns them, and will be denoted by the letter (G), (T), (N), or (E), &c. As far as practicable officers in the Royal Naval Air Service will be selected to go through the specialist courses with a view to filling these posts. Specialist Officers will not draw their specialist allowances. In the initial stages it is necessary to form an arbitrary seniority list. Officers are to rank in accordance with this list, which has been, as far as possible, based on air experience. Some exceptions have been made on account of the relative age and seniority of officers prior to their entry into the Naval Wing.

Subsequent to the date of this letter all entries to the Royal Naval Air Service will be graded from date of transfer or appointment to the rank of Flight Lieutenant or Flight Sub-Lieutenant. All promotions will be by selection, but as a rule no Flight Lieutenant will be promoted to Flight Commander unless he has served for at least two years as Flight Lieutenant, and no Flight Commander will be promoted to Squadron Commander unless he has served at least one year as Flight Commander. As regards discipline, officers on the Official List of the Royal Naval Air Service shall rank with each other and command in the order in which they stand on that List, and each officer, as long as he remains on that List, shall be subordinate to every officer whose name stands higher than his own, whatever may be their respective positions in other branches of the Royal Navy. Further, no officer (except those holding executive rank in the Royal Navy) shall ever assume any charge or command whatsoever except that which may appertain to the Air Service, or relate to the officers or men thereof, unless he receives express authority to assume such charge or command either from the Admiralty, or, in case of emergency, from the Senior Naval Officer present. In exercising charge or command outside the Air Service, Officers in the Royal Navy and Royal Marines shall rank and command in the order in which their names stand in the Official List of officers of their original Branch in the Royal Navy. The names of officers of the Royal Navy who are selected for employment in the Royal Naval Air Service will be shown in the Official Navy List in italics in the Seniority List of the Branch to which they belong, and similarly when they revert to their original Branch their names will be shown in italics in the list of officers of the Royal Naval Air Service in the Navy List. Officers entered direct from civil life will hold a position of entire equality in the Royal Naval Air Service in every respect with officers of the Royal Navy or Royal Marines who are of the same grade and seniority. In order to identify them closely with the Royal Navy and for their general instruction they will be embarked in a ship of war for a definite period in each year. Their rates of pay will not be affected during this period, except that they will not receive flying pay. Medical officers who may be employed in the Naval Wing will not be graded, but will be subject to the special instructions which have been issued. Officers of the non-military branches of the Royal Navy and officers of the Army who may be selected for the Royal Naval Air Service will be granted commissions or warrants in the Royal Naval Air Service ranks on being graded.

C.—Men.

Applications for Enrolment.—All classes of ratings on the active list are eligible for selection for the Royal Naval Air Service. Men holding higher non-substantive ratings or who are qualified artificers-divers will not be selected. Preference will be given to young men who have not yet specialised in any particular non-substantive rating. Ratings who desire to volunteer are to apply to their Commanding Officers. Applicants must have had an assessment not less than V.G. for character during the five years' previous service; or if their total service is less than five years this standard must have been maintained during the whole period. Before forwarding the names of volunteers Commanding Officers are to satisfy themselves that the men are likely to prove suitable, regard being paid to general intelligence, education, and quickness. If the volunteers are recommended, their names, accompanied by a copy of their Service Certificates and with a statement of any special qualifications they may possess, should be forwarded to the Commodore of their Port Division (or to the Commandant in the case of the Royal Marines). These officers will forward the applications to the Director of the Air Department, Admiralty, for selection as required. Men belonging to the Reserve Forces should apply to their respective registrars (through their Commanding Officers if serving afloat). Civilians are also eligible for direct entry into the Naval Air Service as mechanics, &c., as laid down in the special regulations on this subject.

Conditions of Service.—Men from the active list will be required to remain for four years in the Royal Naval Air Service. After this period of service they will as a general rule revert to their ordinary duties in the Fleet, but are subsequently eligible for re-selection at the discretion of the Admiralty. Men who have completed more than eight years' service in a man's rating will be required to re-engage to complete time for pension in the Royal Navy before selection or re-selection for service in the Royal Naval Air Service. These regulations in regard to re-engagement do not apply to ratings already in the Naval Air Service. Men who may volunteer whilst upon Foreign Service will not be selected until they return to home waters. Any Special Service ratings who may be selected will be required to transfer to continuous service and to volunteer under the conditions for continuous service ratings. Men from Civil Life will be required to sign an engagement to serve four years in the Royal Naval Air Service, to be followed by four years in the Royal Naval Air Service Reserve. Men of the Reserve

Forces who may be selected will be required to sign an engagement to serve for four years in the Royal Naval Air Service, to be followed by four years in the Royal Naval Air Service Reserve. In special circumstances they may, at the discretion of the Admiralty, be permitted to re-engage to extend their period of active service before discharge to the Reserve. Whilst in the Royal Naval Air Service they will cease to belong to the R.N.R., R.N.V.R., or R.F.R. Forces, the R.N.R. and R.F.R. retainers will not be paid nor will the rules as to drills be applicable, but the time both in Active Service and Reserve will count as service towards gratuity, and, in the case of the Royal Naval Reserve, towards the medal. In the case of men from the R.N.V.R., their time will count for the medal under the conditions applicable. All ratings in the Royal Naval Air Service will be liable to be detailed for any branch of the Service, *i.e.*, Seaplane, Aeroplane, Airship, Seaplaneship, or Kite work either afloat or ashore, at home or abroad. In time of war they may be required for either naval or military purposes. The selection of a man for service in the Royal Naval Air Service does not necessarily imply that the man will be trained as a pilot. Men to be trained as pilots will be specially selected from those who have joined the Air Service. This regulation is to be explained to men who may volunteer by their Commanding Officers before their applications are forwarded. Any rating who is at any time found to be unfitted for the duties of the Royal Naval Air Service will be discharged, and those who previously belonged to the Royal Naval Forces will revert to their position therein. This will not necessarily imply that any blame is attributable to the man.

Grades.—All ratings enrolled in the Royal Naval Air Service will be graded in one of the following ratings. Men who, for special reasons may not be so graded, will continue in all respects under the conditions of the general naval service as regards pay, advancement, &c. :—

General Branch.	Engine Branch.	Artisan Branch.	Relative Naval Rating.
C.P.O. Mechanic—	C.P.O. Mechanic (E)	C.P.O. Mechanic (C)	
1st Grade* ...	1st Grade* ...	1st Grade* ...	C.P.O.
2nd Grade ...	2nd Grade ...	2nd Grade ...	C.P.O.
3rd Grade ...	3rd Grade ...	3rd Grade ...	C.P.O.
P.O. Mechanic ...	P.O. Mechanic (E) ...	P.O. Mechanic (C) ...	P.O.
Leading Mechanic ...	Leading Mechanic (E) ...	Leading Mechanic (C) ...	Leading Seaman
Air Mechanic—	Air Mechanic (E)—	Air Mechanic (C)—	
1st Grade ...	1st Grade ...	1st Grade ...	A.B.
1st Grade (acting)* ...	1st Grade (acting)* ...	1st Grade (acting)* ...	A.B.
2nd Grade ...	2nd Grade ...	2nd Grade ...	A.B.

Ratings transferred from the general naval service or entered direct from the shore or from the Reserve forces will be selected to join one or other of these branches in accordance with their attainments and qualifications. Ratings will rank and take command within the Royal Naval Air Service according to their grade and their seniority in that grade. Outside the Royal Naval Air Service their authority will be regulated by their naval or military rank.

Conditions in regard to Selection and Advancement.—The general conditions in regard to selection and advancement are contained in Appendix IV to this letter.

D.—Pay.

Officers.—The pay of the various ranks will be as follows :—Wing Captain, £2 10s. per diem. Wing Commander, £2 per diem. Squadron Commander, £1 5s. per diem. Flight Commander, 17s. and 2s. per diem in addition for each year's service as Flight Commander (maximum, 23s.). Flight Lieutenant, 12s. and 1s. per diem in addition for each year's service as Flight Lieutenant (maximum, 16s.). Flight Sub-Lieutenant, 10s. Flying Pay for Squadron Commanders, Flight Commanders, Flight Lieutenants, and Flight Sub-Lieutenants, 8s. per diem. Warrant Officers—1st Grade, 12s. per diem. 2nd Grade, 11s. per diem. Warrant Officers when in charge of stores will be eligible for store allowance on the following scale :—Store allowance for main stations, 1s. per diem. Store allowance for subsidiary stations, 6d. per diem. Store allowance for Coast Guard stores, 3d. per diem. Warrant Officers who qualify as pilots will be paid flying pay 4s. per diem, if they obtain a first-class flying certificate, and 2s. per diem if they obtain a second-class flying certificate. Warrant Officers when graded will discontinue their Specialist Allowances.

Observers and Casual Passengers.—Officers and men who do not belong to the Royal Naval Air Service, but who may be required to ascend on duty, will be granted the following allowances in addition

* These ratings are only applicable to men drawn from the Royal Navy and Royal Marines.

to their naval pay:—Commissioned Officers, 5s., Warrant Officers, 3s., Men, 2s. flying pay for each day of such ascent. Whilst under instruction as Observers, officers will be paid an allowance of 3s. per diem for each day of ascent instead of flying pay at the above rate.

Meteorological Duties.—Officers who are not graded in the Royal Naval Air Service and who may be employed on meteorological duties at Royal Naval Air Stations may be granted an allowance of 2s. per diem.

Commissioned Officers whilst under Instruction will receive the pay of their acting flying rank, and an allowance of half the Flying Pay to which they are entitled on the above scale.

Warrant Officers whilst under Instruction for Pilot will receive 1s. per diem flying pay continuously, in addition to the pay of their substantive rank.

Messing Allowances.—Whenever attached for duty to a Military Mess officers will be granted an allowance of 2s. per diem difference of Mess Subscription. This allowance will not be payable in the case of Probationary Flight Sub-Lieutenants.

Pay whilst Sick, &c.—As regards both officers and men in case of illness or accident the pay of their Air Service Ranks will be continued under the same regulations as Naval Pay. Flying Pay will be continued under the same regulations as submarine allowance.

Men.—The pay of the various grades will be as follows:—C.P.O. Mechanic: 1st Grade, 10s. 6d. per diem (this rate is for exceptional cases only). 2nd Grade, 9s. per diem. 3rd Grade, 7s. per diem. P.O. Mechanic, 6s. per diem. Leading Mechanic, 5s. per diem. Air Mechanic: 1st Grade, 4s. per diem. 1st Grade (acting), 3s. per diem (for men drawn from Royal Navy or Royal Marines only). 2nd Grade, 2s. per diem. Ratings who qualify as pilots will be eligible from the date of qualification for additional pay at the rate of 4s. per diem for first-class certificates, and 2s. per diem for second-class certificates. Men will be allowed to hold second-class certificates for 12 months only. If they have not then qualified for first-class certificates it will be considered whether their second-class certificate should be retained. Men whilst under instruction for Pilot will receive 1s. per diem flying pay continuously in addition to the Naval Air Service Rate which they may be receiving at the time. The selection of men to qualify as Pilot will be made at the Admiralty from time to time, and no ratings are to be so trained without authority. All ratings will receive good conduct badges under the present Naval Regulations, and they will receive pay at the rate of 1d. per diem for each good-conduct badge they possess. Re-engage pay will be payable where applicable under Naval Regulations. Service in the Royal Naval Air Service will count towards medal gratuity, and pension under the regulations applicable. Ratings qualified and employed as pilots of airships will receive Airship Coxswain Allowance at the rate of 4s. per diem continuously, whilst so employed. Ratings qualified and employed as crews of airships will receive flying pay at the rate of 2s. continuously whilst so employed. These airship allowances will be applicable to permanent crews of any large "heavier than air" craft.

E.—Uniform.

Naval Officers who already belong to the Military Branch will wear the uniform of their rank with the addition of an eagle on the left sleeve above the distinctive lace. Other Naval Officers who join the Royal Naval Air Service will wear naval uniform with the distinctive lace of their relative rank in the Military Branch, and an eagle on the left sleeve above the distinctive lace. Marine Officers will wear the uniform of the Royal Marines with the addition of an eagle on the left sleeve above the cuff. Others who join the Royal Naval Air Service will wear the uniform of their corresponding rank in the Military Branch of the Royal Navy with the exception that the anchor on buttons, cap badge, epaulettes, and sword belt will be replaced by an eagle. During preliminary courses of instruction whilst under training Officers will not be required to alter their uniform in any respect. Officers who may hold a higher rank in their original branch than that which they have been granted in the Naval Air Service will continue to wear the uniform of such higher rank or relative rank (modified as above), but this will not entitle them to any higher position in regard to the duties of the Royal Naval Air Service than that which they are entitled to by their position in the Air Service List of Seniority. The description of the flying dress and of the special working dress will be issued subsequently. The uniform for all men

graded in the Royal Naval Air Service will be the naval uniform of their rating with the following alterations in regard to badges:—All men other than Chief Petty Officers will wear the Royal Naval Air Service Distinction Badges on the right arm. These badges will consist of a pair of wings in addition to a distinguishing mark showing their special air service qualifications, i.e., Pilot or Coxswain, Carpentering, Engineering, &c. Chief Petty Officers will wear similar badges on the collar. On the left arm Petty Officer Mechanics and Leading Mechanics will wear the usual naval symbols of their authority, together with such naval good conduct badges as they may possess. Men below the grade of the Leading Mechanic will wear their naval good conduct badges on this arm. No other naval badges will be worn. Men drawn from the Royal Marines and from the Army will wear the uniform of their Corps for the present. Men specially entered from civil life will wear the naval uniform for Class III (ratings not dressed as Seamen) with similar badges to those described above.

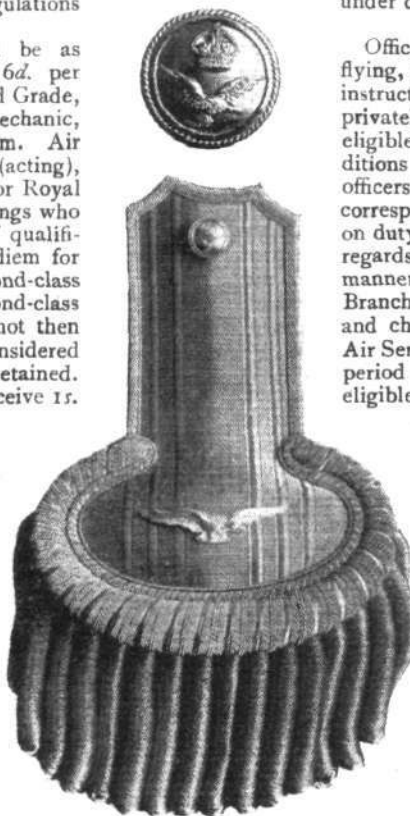
F.—Training and Pay of the Reserve of the Royal Naval Air Service.

The details in connection with this are at present under consideration.

G.—Pensions.

Officers of the Royal Naval Air Service injured whilst flying, either on duty or when undergoing a course of instruction at one of the instructional establishments, or privately with the permission of the Admiralty, will be eligible for pensions and gratuities under the same conditions and on the same scales as in the case of other officers of the Military Branch of the Royal Navy of their corresponding rank wounded in action. Officers injured on duty, but not while actually flying, will be treated as regards Wounds Pensions and Gratuities in the same manner as officers of corresponding rank in the Military Branch injured on duty but not in action. The widows and children of officers dying whilst in the Royal Naval Air Service will, subject to the completion of the necessary period of commissioned service on the active list, be eligible for pensions and compassionate allowances under the same conditions and on the same scales as officers of corresponding rank in the Military Branch of the Royal Navy; but in the event of an officer's death being attributable to an injury sustained whilst flying, either on duty or when undergoing a course of instruction at one of the instructional establishments, and occurring within seven years of the date of such injury, the award of pensions, gratuities, or compassionate allowances to the officer's widow and children or other relative will be made, irrespective of the length of service, under the conditions applicable to the case of officers of corresponding rank in the Military Branch of the Royal Navy killed in action. In the event of death resulting from an injury sustained on duty, but not whilst flying, any pensions and allowances awarded to dependant relatives will be on the scale and subject to the conditions laid down for officers of their corresponding rank in the Military Branch who deaths are attributable to injuries received on duty but not in action. Probationary Flight Sub-

Lieutenants will, if injured whilst flying, either on duty or when undergoing a course of instruction at any of the instructional establishments, or privately with the permission of the Admiralty, be eligible for pensions and gratuities under the same conditions and on the same scales as Sub-Lieutenants, Royal Navy, wounded in action, and in the event of death occurring as the result of such injury within seven years, pensions, &c., will be awarded to the officer's widow and children or other relative under the conditions applicable in the case of Sub-Lieutenants, Royal Navy, killed in action or dying of wounds received in action. Probationary Flight Sub-Lieutenants, if injured on duty but not whilst flying, will be awarded pensions and gratuities on the scales and subject to the conditions laid down for Sub-Lieutenants, Royal Navy, injured on duty but not in action. In the event of death resulting from an injury sustained on duty but not whilst flying, any pensions and allowances awarded to dependant relatives will be on the scale and subject to the conditions laid down for Sub-Lieutenants, Royal Navy, whose deaths are attributable to injuries received on duty but not in action. In the event of a probationary Flight Sub-Lieutenant dying during his period of probation from natural causes, no pension or compassionate allowance will be granted to the widow, children, or other relatives of the officer. In any cases where the substantive rank of officers in their original branch is higher than



The epaulette and button of the new Royal Naval Air Service.

that which they are granted in the Royal Naval Air Service, Wounds Pensions and Gratuities, Widows' Pensions, Compassionate Allowances, &c., may be based on the original rank of such officers, if this is more advantageous to these officers or their dependent relatives. Officers of the Royal Navy and Royal Marines who do not belong to the Royal Naval Air Service who are injured or killed whilst flying on duty, or whose death, being attributable to injury whilst flying, takes place within seven years of the date of such injury will be regarded as injured or killed in action, and pensions or compassionate allowances awarded to themselves or to their dependent relatives accordingly. The Regulations in this section do not apply to Army Officers seconded for service in the Royal Naval Air Service whose rights as well as those of their widows and children are determined by Army Regulations.

Men.—In the case of men the conditions laid down in the event of their being killed in action or dying from wounds received in action will also be applicable, the present limit of two years being extended to seven years. Men invalided for injury received during employment in the Air Service will be awarded pensions, either temporary or permanent, at the rates prescribed in the Naval Regulations for men discharged on account of wounds or hurts sustained in action. These rates vary from 6*d.* to 2*s.* per diem (with additions for Petty Officer service, &c.), according to the nature of the injury and the degree of incapacity arising from it, or, at the discretion of the Admiralty, gratuities may be awarded in lieu.

Appendix I is as follows:—

Air Officers.

Whilst employed upon the duties of the Royal Naval Air Service, Officers whose names are upon this list rank and take command in the order that their names stand upon the list. Whilst Officers from the Royal Navy are so employed, their names are specially in *italics* on the list of their rank in the Royal Navy in order to indicate that their naval rank is in abeyance. The first Royal Naval Air Service Seniority List has been framed on an arbitrary basis. All Officers who may subsequently enter the Royal Naval Air Service will, on being first graded, be placed at the bottom of the list of Flight Lieutenants, with the exception that if any Officers are entered for some particular duty a temporary grade of a higher nature may be given to them to give them the necessary authority and precedence. Promotion from grade to grade will be by selection and not by seniority. The seniority in the Naval Air Service Grade, as regards Officers now on the list, will count as from the date of this Circular Letter. Time served previously in grades of

the same name will not count as seniority. The following letters before an Officer's name serve to indicate that he holds an appointment for the following specialist duties:—(G) For Gunnery duties. (T) For Torpedo duties. (N) For Navigation duties. (W/T) For W/T duties. (E) For Engineering duties. (C) For Carpentering duties.

Seniority of Air Officers.

Director of the Air Department.—Capt. M. F. Sueter, C.B.

Wing Commanders.—O. Schwann, E. A. D. Masterman, F. R. Scarlett, E. M. Maitland, N. F. Osborne, C. R. Samson.

Squadron Commanders.—F. M. L. Boothby, E. L. Gerrard, R. Gregory, A. M. Longmore, R. Gordon, C. M. Waterlow, H. L. Woodcock, J. W. Seddon, (G) R. H. Clark-Hall, (E) G. W. S. Aldwell, (E) C. R. J. Randall, S. D. A. Grey, C. J. L'Estrange-Malone, P. A. Shepherd, R. B. Davies, (E) E. F. Briggs, I. T. Courtney, C. E. Risk, C. L. Courtney.

Flight Commanders.—C. E. Rathborne, R. Pigot, D. A. Oliver, W. R. Crocker, T. G. Hetherington, J. N. Fletcher, Hon. J. D. Boyle, J. D. Mackworth, (W/T) W. P. de C. Ireland, (E) J. L. Travers, J. T. Babington, F. E. T. Hewlett.

Flight Lieutenants.—A. C. Barnby, H. Fawcett, H. D. Vernon, R. P. Ross, F. W. Bowhill, A. W. Bigsworth, A. B. Gaskell, C. E. Maude, F. G. Brodribb, E. T. R. Chambers, H. A. Williamson, C. R. Kilner, (E) W. Briggs, (E) T. R. Cave-Brown-Cave, (G) E. D. M. Robertson, (T) D. H. Hyde-Thomson, R. L. G. Marix, H. A. Littleton, A. J. Miley, W. C. Hicks, E. Osmond, W. G. Sitwell, C. R. Finch-Noyes, I. H. W. S. Dalrymple-Clark, C. H. Collet, R. J. Bone, C. H. K. Edmonds, (E) I. G. V. Fowler, (E) H. M. Cave-Brown-Cave, C. E. Robinson, J. T. Cull, (E) C. D. Breese, B. D. Ash, E. R. C. Nanson, E. H. Sparling, R. G. Lock, A. D. Cunningham, J. W. O. Dalgleish, R. H. Kershaw, T. A. Rainey, D. G. Young, R. E. C. Pierce, Lord Edward Grosvenor, C. F. Beevor, C. Draper, H. A. Busk, E. T. Newton-Clare. Acting Flight Lieutenants whilst undergoing flying course: G. W. W. Hooper, G. R. Bromet, L. Tomkinson, J. R. Smyth-Pigott.

Flight Sub-Lieutenants (Probationary).—C. Wilson, R. Wright, F. M. L. Barr, H. G. Wanklyn, J. M. R. Cripps, B. F. Bainsmith, L. B. Hay.

Warrant Officers, First Grade.—(E) H. Ellison, (E) F. H. Williams.

Warrant Officers, Second Grade.—(E) F. W. Scarff, (C) T. D. Jones, (C) J. G. Brownridge, H. C. Bobbett, F. Everett, (E) L. Killmayer, (C) W. A. Hancock, (E) H. Dearman, (E) W. F. Floyd, G. A. J. Blundell, C. King, (C) L. Staddon.

THE TRANS-ATLANTIC FLIGHT.

LIEUTENANT PORTE'S NEW ROUTE.

THE Curtiss flying boat, "America," on which Lieutenant J. C. Porte, R.N., proposes to attempt the flight across the Atlantic, is now finished, and has been erected at Hammondsport, N.Y. Preliminary tests are being made over Lake Keuka, the first, in which the machine carried Lieut. Porte, Mr. Hallett, the mechanic, and Mr. Glenn Curtiss, being made on Tuesday and giving the results expected. If the tests justify anticipations, the machine will be dismantled and sent to St. John's, Newfoundland, to await favourable weather, and it is hoped to start on July 15th or 16th. The original plan, it will be remembered, was to take the direct route from Newfoundland to the Irish coast, but this has now been abandoned, and Lieut. Porte and his companion will set their course for the Azores, whence they will proceed to the coast of Spain. Arrived here they will follow the steamship route as far north as Ushant, a small island off the coast of Normandy, and from here it is intended to set the course for England.

By adopting this route, the greatest distance to be covered is approximately 1,200 miles between Newfoundland and the Azores, and Lieut. Porte feels confident that the two Curtiss engines will be able to stand up to a run of sufficient duration to complete this distance. In their tests on the bench, under conditions approximating as near as possible to those of actual flight, the two motors have completed 30-hour non-stop runs.

The principal difficulties which the trip presents are navigational ones, and to solve these Lieut. Porte has had the best expert assistance. It is understood that he may possibly have the advantage of the assistance of Capt. Creagh-Osborne, R.N., in the adjustment of his compasses and other navigational problems, as this officer, who is Superintendent of the Compass Department at the Admiralty, will be on leave of absence in Canada, and has accepted an invitation from Lieut. Porte to inspect the Curtiss flying-boat and witness the start at St. John's should his other engagements allow of it. It is hoped that the Washington Meteorological Office will render most valuable assistance in enabling the start to be made at the right moment, and all experts who have been consulted admit that Lieut. Porte, in choosing the route that

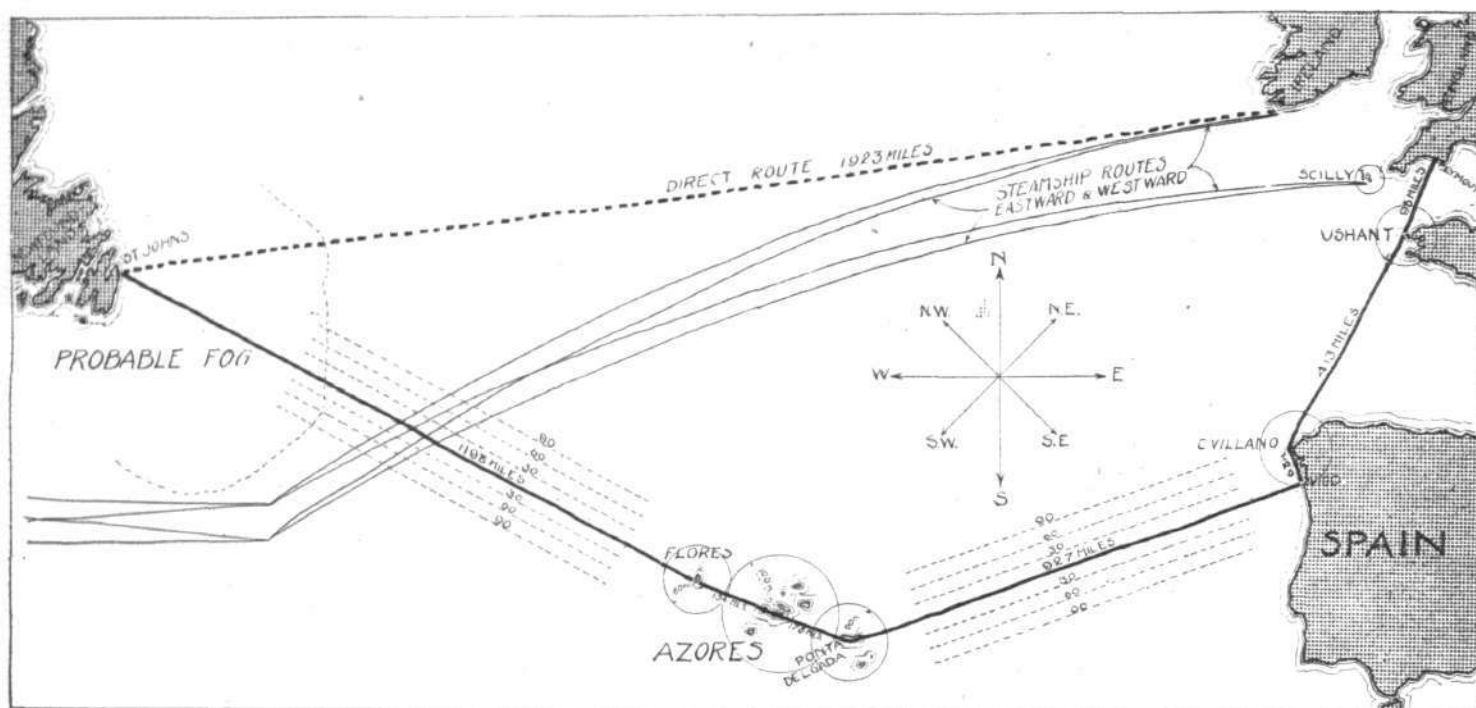
he has selected, has adopted the course most likely to have the greatest number of factors in his favour.

A possible opportunity for a favourable start from Newfoundland would be afforded by a large high-pressure area south of latitude 40° N., and a constant succession of shallow cyclonic systems travelling eastwards north of that latitude, advantage being taken of the north-west wind in the rear of one of these, and the west wind on the north side of the high-pressure system to start for the Azores, trusting to a south-west wind to assist on the eastern side of the Atlantic, due to the presence of a low-pressure system in that section. A start cannot be made with any prospect of success unless some such conditions prevail.

The machine to be used for the trip will not, as originally intended, be a tractor biplane with a single 200 h.p. Curtiss engine, but a large flying boat somewhat similar in its general arrangement to the standard type Curtiss. Pilot and passenger will be accommodated in a roomy cockpit entirely covered in and fitted with sliding windows for purposes of observation and ventilation. Behind the two seats, which are arranged side by side, will be the sleeping quarters furnished with a mattress on which the pilot and his passenger may in turn lie down to have a rest, and which will moreover serve as a floating "raft" in case of accidents.

The dual control will be slightly different from the standard Curtiss control, which, it will be recalled, consists of a rotatable hand-wheel for steering, a to-and-fro movement for the elevator, and a shoulder yoke for the ailerons. As the trans-Atlantic machine has very large ailerons, it has been thought inadvisable to employ the yoke, which imposes a considerable strain on the pilot's shoulders, and in its stead a pivoted foot-bar is fitted, by means of which the ailerons are operated. Rudder and elevator are controlled by means of a rotatable wheel on a rocking column.

The boat itself is more or less of the usual Curtiss type, but has been more carefully streamlined in order to reduce head resistance. In spite of its large size—it has an overall length of 32 ft. and a beam of 4 ft.—the hull is very light, weighing only about 550 lbs. It is built up of a framework of ash and spruce covered with a



Map showing the route (in thick black line) which Lieut. J. C. Porte proposes to follow. The distances are in land miles. The dotted lines parallel to the course are 30, 60 and 90 miles to north and south of proposed course. The circles round the islands and mainland indicate the probable limits of vision from the machine. The direct route originally suggested is shown in a thick dotted line.

planking of cedar $\frac{1}{4}$ inch thick, which is coated with oiled canvas. The wings, in addition to being much larger than those of the standard type Curtiss—the span of the upper plane is 72 ft. and that of the lower plane 46 ft., whilst the chord is 7 ft.—are of a different section, being of a curvature similar to the N.P.L. section, which is expected to considerably increase the efficiency.

Instead of the single 200 h.p. engine which it was originally the intention to use and which was actually constructed, two Curtiss engines of the type known as the O.X., each of 100 h.p., will be employed. Each engine will drive a single propeller of 8 ft. diameter. The total weight of the machine in flying trim is stated to be 5,000 lbs., divided up in the following manner: Fuel, 2,000 lbs., made up of 300 gallons of petrol, and 25 gallons of oil; hull, 550 lbs.; pilot and passenger, 300 lbs.; engines, wings, tanks, and supplies, 2,150 lbs.



Raynham and Salmat in Ireland.

LAST weekend Mr. F. P. Raynham and Mr. Salmat were giving exhibition flights on behalf of the *Daily Mail* in the North of Ireland. On Thursday of last week they were at Lurgan. Mr. Raynham, on the Avro machine which he flew at Brooklands last year, but now converted to a waterplane, started from a small pond, while Salmat on his Blériot started from an adjoining field. In spite of the fact that the whole place was surrounded by trees, making it very difficult to get out, both pilots carried a good many passengers during the day. On Friday Raynham and Salmat were flying during the afternoon, while during the evening they flew the 25 miles to Warrenpoint. Raynham followed the canal from Portadown, and took exactly an hour, but during one half the journey his motor was only firing on five cylinders, and he flew low down between the hills; there was also a strong wind blowing. On Saturday flights were made at Warrenpoint, Salmat starting from the Golf Links and Raynham from the Bay.

Verrier at Manchester.

A BUSY day was spent by Verrier at Manchester on Saturday, and he was flying almost continuously from 11 a.m. to 5 p.m. He took up twenty-four passengers, including Miss Constance Collier, the well-known actress, and Alderman McCabe, the Lord Mayor of Manchester. At 5 p.m. Verrier with his mechanic left Trafford Park in very stormy weather for Hendon, where he eventually arrived at 9 p.m. after having made a stop at Birmingham.

Wood for Propellers.

MESSRS. JOSEPH OWEN AND SONS are unloading from the ss. "Nitonian" 1,093 prime black walnut boards which have been specially selected in the States as suitable for propeller work. The boards are 10 ft. and up long and 9 ins. and up broad, and propeller makers should make a point of obtaining from the firm at 199A, Borough High Street, further particulars of these parcels.

In the accompanying map is shown the route which will be followed, and the various distances that have to be covered. It will be noticed that for a considerable portion of the first stage, from Newfoundland to the Azores, the route will intercept numerous steamship routes, so that on this part of the journey at any rate the intervals between sighting ships should not be very long. It is hoped that captains of vessels will render assistance by flying the following signals to indicate on which side of the aviator's route they are:—

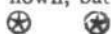
When on the north side of the route fly the following signals from the foremast:

If 90 miles to 60 miles from route, fly square flag, ball, square flag.

If 60 miles to 30 miles from route, fly square flag, square flag.

If 30 miles to 0 miles from route, fly square flag.

When on the south side of the route the same signals are to be flown, but from the mainmast.



An Appeal for Madame Petitpierre.

IN connection with the sad case of Mme. Petitpierre, whose husband, as many of our readers will remember, was shot at Hendon in August, 1911, we have received the following appeal from Col. Massy:—

"I beg to bring to your notice the very distressing case of Madame Petitpierre of Fairview, Collindale Avenue, Hendon, N., whose husband was assassinated at Hendon some three years ago while in the employ of the Blériot Flying School. She has remained in England in hopes of enlisting the sympathy of persons interested in aviation, but without success, and is now in very critically reduced circumstances. The very smallest contributions will be thankfully received by her, or may be sent to me at the above address.

"The late M. Petitpierre being French, the Aerial Leagues to which I belong are unable to come to the assistance of his unfortunate widow as they did in the cases of Mrs. Lindsay Campbell and Mrs. Cody, and I therefore am appealing personally on behalf of Madame Petitpierre.

"H. S. MASSY, Colonel.

"63, FitzGeorge Avenue, West Kensington, W., June 22nd."

More Emaillite Successes.

FIVE of the eight competing machines in the London-Manchester-London race, including the first, second and third home, were doped with British Emaillite throughout, thus further adding to the existing record of successes in the Gordon-Bennett Cup contests of 1911, 1912 and 1913, the Aerial Derby of 1914 and the majority of all the speed contests of the past three years. These facts are eloquent. The winning machine in the London-Manchester Race was doped with a combination of Grades 2, 3 and 4, and manufacturers should note that this combination is claimed to materially increase the flying speed of any machine, owing to the almost complete absence of air friction ensured by such combination, the friction in fact being no more than that offered by a highly polished steel plate.

THE FLYING MACHINE FROM AN ENGINEERING STANDPOINT.

By FREDERICK WILLIAM LANCHESTER, M.Inst.C.E.

(Continued from page 663.)

10. *Vertical Surface.*—One of the quantities of great importance in connection with the type of stability known as rotative or spiral stability is that of vertical surface. It is of great importance to be able to compute with accuracy the effective distribution of vertical surface in any machine, and of recent years considerable attention has been devoted to, what we may term, the "valuation" of accidental vertical surface. For example, every vertical or inclined strut has a certain directive value which may be expressed in terms of vertical surface; the alighting wheels, especially if of disk form, represent considerable areas of the equivalent vertical surface; even the fuselage (the stream-line body or car) has its equivalent value as vertical surface. It was pointed out by me some years ago (*Engineering*, 26th February, 1909) that a screw propeller moving other than axially experiences a considerable lateral force. More recently Mr. T. W. K. Clarke has called attention to this action and to the importance of considering the propeller in its capacity as effective vertical surface. It appears from Mr. Clarke's investigation (see Memorandum 80 of the Report of Advisory Committee, 1912-13) that the propeller equivalent in terms of vertical surface is a very large and serious factor, and one that under no circumstances should be ignored. The Memorandum in question is worthy of careful consideration by all engaged in the design or construction of flying machines.

A point that should not be overlooked is that the propeller value in the sense under discussion is totally different when under power and when dragging or stationary; this suggests the desirability of locating the propeller as near to the centre of gravity (in the fore-and-aft sense) of the machine as conveniently possible.

11. *The Dynamic Load Factor and Factor of Safety.*—A matter of importance, and one of a controversial nature, is the factor of safety necessary in order to take care of the many and varied conditions met with by a machine in flight. In the simple case of a machine in horizontal flight in calm weather we know that the load supported by the aerofoil is the weight of the body of the machine and its associated parts, but not including the aerofoil itself, whose weight is directly distributed over the pressure surface; also we know that in the various evolutions a machine is called upon to perform the stresses may considerably exceed the normal, and that variations of effective load are experienced due to wind-gusts which it is quite out of the power of the pilot to prevent. Excluding for the time being the latter, we are clearly able to define the worst that the pilot is able to do and specify the factor by which the normal stresses must be multiplied in order to represent the actual stresses; conversely, we may specify arbitrarily a factor of safety, and we may tell the pilot just what he is permitted to do, and just what he cannot undertake without risk. Taking in the first instance the assumption that the pilot is allowed to do his worst—he is to be allowed to try to wreck his machine. There are two ways in which he can operate; first, he can drive his machine at the highest possible speed and suddenly alter his elevator to the position corresponding to the lowest possible speed; alternatively, he may take sharp turns involving heavy banking. Now the highest possible speed is the limiting velocity which the machine will acquire falling head first vertically; this, with machines at the present day constructed, may be estimated at about 140 to 150 miles an hour. The lowest velocity in the present sense is the velocity at which the aerofoil is meeting the air at its critical angle (the lowest velocity capable of giving a pressure reaction equal to the weight); this may be taken for the purpose of our argument as 40 miles an hour. If when falling vertically at 140 miles an hour the pilot with absolute suddenness jerks his elevator into the position corresponding to 40 miles an hour, the reaction brought to bear on his aerofoil is $(140 \div 40)^2 W$, that is to say, approximately, twelve times the weight of the machine. In practice, for the figures given the maximum load would be diminished, since the elevator cannot be moved with absolute suddenness, and, if it were, the machine could not answer the elevator and alter its attitude to the line of flight immediately. It is probable on the basis of the figures given that 10 W is the maximum effective load that could under any circumstances be brought to bear.

In the case of severe banking, if the machine be banked to an angle θ the resultant of the weight and centrifugal force is the value $W \sec \theta$. I have frequently made estimates of the angle of banking when a pilot has been making a steep spiral dive; the angle rarely exceeds 60° or 70° . Taking 70° as the maximum, the stresses in the machine will correspond to a load equal to 3 W.

From the foregoing it would appear almost certain that in calm

weather the pilot, if asked to do his worst, cannot in any manner reach or exceed ten times the stresses due to the static load.

Let us take what may be considered an extreme gust. The machine enters air, or is struck by a gust represented by a change of velocity equal to half the flight speed. Assuming the machine has time to swing to its appropriate relative direction under the new conditions, a simple resolution of velocity shows that the worst condition is that in which the direction of motion of the gust is directly opposed to that of flight, in such a case the relative velocity of the machine becomes $1\frac{1}{2}$ times normal, and the effective load on the aerofoil will be $(1\frac{1}{2})^2 = 2\frac{1}{4}$ times normal. In case of the machine being struck by a sudden gust or squall, the load will be considerably higher, but still does not approach the figure 10 obtained on the basis of the pilot suddenly "flattening out" when at maximum speed.

It is evident from the foregoing that a flying machine in the course of its normal usage is liable to stresses many times greater than that of its normal load, and the frequency of these stresses, and the total number of times they occur in the life of the machine, will be related to their magnitude by some empirical law for any given class of service. In such a case it is evident that the term "factor of safety" does not carry its ordinary meaning; if, for example, in the lifetime of a fleet of 100 machines the stresses reach 6 times normal once, and 5 times normal, say, 10 times, and 4 times normal, say, 150 times, it will be certainly sufficient and proper if the designer work to 6 times the normal load for his elastic limit without using any factor of safety in the accepted sense at all; to do otherwise would be to burden the whole 100 machines with a weight of superfluous material without justification. Whether under these conditions we continue to employ the term "factor of safety" or not* the aeronautical designer must bear clearly in mind that in his particular case his factor has a double function, namely, both to give the margin of strength and durability needed under ordinary conditions of flight, and to provide for abnormal conditions of stress, occasionally even almost to the theoretical limit of the strength of the structure.

In Memorandum No. 96 of the Advisory Committee (not yet included in an annual report), the matter is fully considered, and the extreme probable values are estimated as follows:—

Nature of Contingency.	Computed Dynamic Load Factor.	Nature of Contingency.	Computed Dynamic Load Factor.
Gusts ...	4.0	Flattening out	8.0
Banking ...	1.4	Looping†	4 to 5

In the report in question ‡ the recommendation is made that a factor N be adopted in design not less than 5 or 6, this being considered sufficient to take care of anything likely to happen to a machine with reasonable and proper pilotage. Tests and calculations of the wing spars of different existing machines gave the following results:—

Type.	Value of N.	How Determined.	Type.	Value of N.	How Determined.
A	4	By experiment	E	3	By calculation
B	4	"	F	4	By experiment
C	5	By calculation	G	7	By calculation
D	3	"			

The R.A.F. have adopted a factor somewhat greater than that recommended in the memorandum in question; a machine (G in above Table), of which the aerofoil was tested to destruction, actually recorded 8.4.

In connection with the subject of aerofoil structure it is to be observed that the stress distribution varies considerably under different conditions, namely, at different angles of attack. Referring to Fig. 15 it will be noted that the aerofoil structure commonly includes two longitudinal members, front and rear respectively, and the proportions of the load borne by each depends upon the position of the centre of pressure and varies with its displacement, which can only be ascertained from experiments on a scale model of the aerofoil itself. This fact needs consideration when computing

* This point may perhaps be emphasized by the use of some qualified expression such as *dynamic load factor*.

† Estimated by me; not in original report. The basis of this estimate is the phugoid chart, Fig. 1, the dynamic load factor is given by the height H in terms of H_{st} , or in the case of looped paths numbered 8 to 12 the value of $H \div H_{st}$ varies from 3.6 to 5.5.

‡ If this factor N cannot with propriety be termed a factor of safety, I suggest the term *factor of contingency*, i.e., the factor of contingency requires to be the equal of greater than the dynamic load factor for which it makes provision.

the maximum stresses on the members in question and the aerofoil structure as a whole.

The calculation of the aerofoil structure not only comprises the resolution of the main lifting-force distribution, as already discussed, but also entails the calculation of the longitudinal stresses due to line-of-flight, or "drift" forces. These may be quite moderate under normal flight conditions, but may become far more severe at

abnormally high speeds*. The treatment of this problem does not offer any serious difficulty; it is to-day generally considered the best practice to provide for the edgewise strength of the wing by its own internal diagonal bracing.

* When a machine is diving head first downwards at or near its limiting velocity the drift load is considerably greater than half the weight of the machine.

(To be continued.)

FOREIGN AIRCRAFT NEWS.

New Duration Record.

CIRCLING round and round above the Johannisthal aerodrome, Basser, on a 100 h.p. Mercedes-Rumpler monoplane, on Wednesday, beat the world's duration record, remaining in the air for 18 hrs. 12 mins. The previous record was Poulet's, 16 hrs. 28 mins. Landsmann, on an Albatros, also made a flight of more than 14 hours' duration.

More Records by Sikorsky.

ON his giant biplane, Sikorsky, on the 18th inst., succeeded in making two new world's records by taking ten passengers to a height of 2,000 metres and carrying six passengers for 6 h. 33 m. 16 s. With ten passengers on board, the machine flew for 1 h. 26 m. 21 s., which beats Faller's record of one hour.

Gnome and Rhone Join Forces.

IT is announced from France that as the result of negotiations which have been in progress for some months, the makers of the Gnome motor and the Rhone motor firm have decided to amalgamate.

A Ponnier "Tabloid."

SOME good results have been obtained at Rheims with a tiny biplane which has been produced by the Ponnier firm. The span is 8 metres, the length 5.3 metres, while the weight is 250 kilogs. The fuselage is exactly the same as that used in the light scouting Ponnier monoplane.

M. Deutsche Founds Another "Chair."

TO his many benefactions to the cause of aeronautics M. Deutsche de la Meurthe has added yet another by providing an endowment of 5,000 francs to provide for a professor of practical and popular aeronautics at the Conservatoire des Arts and Metiers.

Aerial Touring by M. Farman.

ON Sunday week Maurice Farman, with Mdle. Andree Laise as passenger, flew from Buc to Evreux, and after lunch went on to Herqueville, landing in the park of M. Louis Renault. He subsequently returned to Buc along the Seine valley and by Andeleys, Louviers, Acquigny, Gaillon, Vernon, Hecourt, Rosay, and Garancieres. Later Mdle. Laise was taken to Juvisy and back by Minie.

A Surprise Visit.

SOME consternation was caused at Cerquese in the commune of Craches on Tuesday of last week by the arrival during a storm of a strange machine, which made a bad landing. The two occupants suddenly disappeared, and this gave rise to several rumours regarding spies, &c. It transpired, however, that the machine was the Demonge aeroplane which was taking part in the safety competition.

A Monument to Gasnier.

A MOVEMENT has been started at Angers with a view to erecting a monument commemorating the pioneer work of René Gasnier and also to record the first town to town flight—from Angers to Saumur—made by Martinet in the course of the Angers meeting in 1910.

Testing the Dorand Biplanes.

THE escadrille of six Anzani-Dorand machines returned from Dijon to Villacoublay on the 17th inst., thus completing the test flight of 1,465 kilometres which was commenced on the 8th inst.

Mr. B. C. Hucks at Cardiff.

ON Thursday, Friday, and Saturday of last week, Mr. Hucks flew at Sophia Gardens, Cardiff, looping the loop many times, and making long upside-down flights. Among the passengers taken up on Friday was the Chief Constable of Cardiff, while during the afternoon Mr. Hucks took up a cinema operator in order to get some pictures of Cardiff from above. A feature of the evening demonstration was a height estimating competition. Six people estimated within 20 ft. of the exact figure, and the winner was decided by ballot at the Empire in the evening, Mr. Hucks presenting the prize, incidentally seeing the film that had been taken during the afternoon.

On Saturday, a special afternoon demonstration was given, among

Mdme. de Laroche Training for the Femina Cup.

DETERMINED to defend her title to the Coupe Femina, Mdme. de Laroche is at present training at Rheims where she hopes shortly to improve on her last year's record of 323.5 kiloms., which was made on a H. Farman biplane.

In Memory of Lilienthal.

AT Lichterfeld on the 16th inst. a monument was unveiled to the memory of the German pioneer, Otto Lilienthal. A lecture on the work of Lilienthal and his contribution to the development of the aeroplane was delivered by Major Parseval.

Two German Naval Officers Drowned.

A GERMAN naval seaplane which had started from Wilhelmshaven, while flying in the neighbourhood of Heligoland on the 15th inst., suddenly dived to the sea. Although rescue parties were despatched to the scene at once, they were unable to find any trace of the machine or its two occupants.

German Prince Injured.

SERIOUS injuries, including two broken legs, were sustained by Prince Friedrich von Bentheim-Steinfurth in the fall of a machine in which he was a passenger near Siegburg. The pilot—Heller—escaped uninjured.

Fatalities in Russia.

ONE of the leading Russian pilots—G. Jankovsky—was killed close to Gatchina on the 19th inst., when his machine fell from a height of 100 metres. On the following day Capt. Stoiakine was killed at Gatchina when testing a monoplane. Apparently the machine side-slipped when making a turn at a very low altitude. On Monday last Lieut. Borislavsky, together with his passenger, were killed while flying at the St. Petersburg school.

Mishap to the "Schuette Lanz."

AFTER making a cruise over the outskirts of Berlin on the 17th inst. the German military dirigible "Schuette Lanz" made a sudden landing, resulting in considerable damage to the cars.

The Vienna Aeroplane-Airship Disaster.

THE catastrophe which occurred near the Austrian military centre at Fischamend, in the neighbourhood of Vienna was one of the most terrible yet recorded in the history of aeronautics. It appears that on Saturday morning the Körting airship "M III" set out from Fischamend, and soon after a biplane piloted by Lieut. Flatz set off in pursuit. The aeroplane overtook the dirigible, when the latter was at a height of 400 metres. The aeroplane appeared to attempt to rise over the airship, but in some way the two aircraft collided. The aeroplane capsized and fell to the ground, while a great gash was made in the envelope of the airship and an explosion followed. The seven occupants of the car of the airship, Capt. Hanswirt, Lieuts. Hofstetter, Breuer and Hardinger, Corporal Hadima, Private Weber and civilian engineer Kammerer, were all killed and burnt to an unrecognisable extent. The aeroplane fell not far from the wreck of the airship, and both the pilot, Lieut. Flatz, and his passenger, Naval Lieut. Puchta, were killed instantly. The "M III," built in 1911, was 65 metres long, of 3,600 c. metres capacity, and was fitted with two 75 h.p. Körting motors.

The funeral of the victims on Wednesday was attended by the Archduke Peter Ferdinand, while the Emperor was represented by General Paar. During the ceremony a number of aviators taking part in the meeting at Aspern flew over and paid their last tribute by circling three times over the grave.

those present being the Lord Mayor and Lady Mayoress. On the 80 Blériot Mr. Hucks flew to Penarth, where a regatta was in progress.

Marcus Manton at Scunthorpe.

ON Wednesday and Thursday last Mr. Manton indulged in much looping at the Scunthorpe Show. The ground had a ridge and furrow surface, and Mr. Manton had to make pancake landings on each occasion. Nine landings were made altogether, and not a wire was strained, which says something for his skill. The conditions were ideal on the first day, but a severe thunderstorm made things unpleasant on the second day. Four flights were however made, and many loops which roused much enthusiasm.



Edited by V. E. JOHNSON, M.A.

The Use of Models in the Development of the Aeroplane.

(Concluded from p. 666.)

Where the Present-day Aeromodelist has Failed.

Now it is just here, it appears to me, where the present-day aeromodelist has failed, failed signally, though let us hope not disastrously. Aeromodelists, generally speaking, do not appear to have kept either accurate or scientific records of their experiments.

This may be, of course, a gross libel, I should only be too pleased to know it was such. Even supposing they have done so, there has certainly been no general pooling of results. Now if the model is to be worth anything from a scientific point of view in the future, it will not be by each experimentalist ploughing his own lonely furrow, but by a number of real workers and enthusiasts combining together to carry out a certain series of experiments with some useful and definite end in view. By useful and definite end I mean some point on which designers and builders of full-sized machines desire further practical knowledge, which knowledge it appears (at least) highly probable can be obtained from careful and accurate experiments carried out with models.

Full-sized Workers and Modellists must meet.

For this to become possible, it is an obvious inference that full-sized workers and model workers must meet and discuss matters; so far but little has been done in this way; but a beginning has been made, with, I am very glad to be able to say, the most happy results. Each found the other had knowledge unknown to both, and more than one full-sized worker has afterwards quite frankly confessed, that he felt quite sure he had gained as much knowledge as he had given.

Personally, I regard this intercourse of the two parties as essential, if the model is going to play any part in the future development of the aeroplane. One result of such an intercourse will undoubtedly be for the full-sized man to think more of the model and the model man to think less, with, I am sure, the most happy results to all concerned.

Where the Model Scores.

The model scores most heavily, of course, on the score of expense, and from the fact that such experiments can be carried out without danger to human life. In days of adversity, of depleted exchequer and other antagonistic circumstances, the full-sized worker not unnaturally casts his eyes on the model, and is prone to ask himself the question: Is this thing any good? Or it may be that he has at last become convinced, through circumstances into which it is not necessary to enter, that experiments with models can be applied successfully to full-sized work; with the result that his one regret is he had not made more use of such experiments and thereby very possibly saved himself or the company, whose real head he is, thousands upon thousands of pounds.

The Scientific Model.

For well over two years I have carried on in FLIGHT a campaign on behalf of the scientific model: a campaign which I am glad to say is I think at length beginning to bear fruit.

Now what do I mean by a scientific model? I mean several things, and I do not of necessity mean the same thing now that I meant last July or that I may mean next August. A rubber-driven machine built solely for either duration, distance, altitude, &c., is not what I should term a scientific model; it is a scientific toy, that is all. Now there is all the difference in the world between a scientific toy and a scientific model. It does not matter how much scientific knowledge you may cram into your toy, not even if, as I once heard someone say, "It be fair burstin' with it," it is still only a toy. It is a toy because its design is such that it cannot by any stretch of the imagination be applied to full-sized design. Such machines are absolutely useless to full-sized designers or for real scientific experiments, experiments, i.e., which can be usefully applied to full-sized work. I do not say they were not or could not have been of use in the past, but that is gone, and their chance in this respect has been, practically speaking, lost.

We must give up our single sticks, our celebrated A frames, and many other of our most cherished constructional items if we are to build a machine to which the term MODEL can be in any way truthfully and justly applied, and if we do not experiment with models of what use considering at all the question, "The Use of MODELS in the development of the Aeroplane"? Our competitions also must be so arranged that they both can and will be won by real models

and not flying-sticks, no matter however well designed, constructed, and full of science they may be.

Our model aviation knowledge of to-day is far in advance of what it was two or three years ago; there is no need, no necessity whatever to build such a type of machine to get it to fly. Quite good flights can now be obtained with machines to which the term *model* can with some truth be applied. By quite good flights, I mean flights of half a minute and upwards, and a flight of half a minute even is quite long enough to make a scientific observation, more especially if 50 such flights be made and the mean result be taken.

The Type of Model Experiment that is wanted.

We especially want experiments with models fitted with covered-in fuselages of the Canard type, with tailless models of the Dunne type, with models of such a design as to be suitable for military purposes, fighting aeroplanes, capable of firing astern as well as ahead, with models of the combined airship and aeroplane type, a type whose total weight is somewhat heavier than air, but which is capable of rising and flying when propelled through the air at a low velocity. We also want experiments with models carrying, say, small toy cannon, or such like device, and capable of firing them whilst in actual flight in order that we may observe the effect of the gunfire on the model's stability, course, &c. We also require, perhaps, above all things, a hydro-aeroplane which can arise from and alight on the surface of really rough water. Model experiments could undoubtedly help us here, although I am afraid in this case the model would have to be a large one driven by a petrol motor.

The foregoing are only a very few of a long list of experiments that could be carried out with considerable gain to aviation work generally.

Model Research Work.

No real distinction, no hard and fast line can very possibly be drawn between investigations made with what I have termed the scientific model and model research work; save that much of the latter is generally carried out in the laboratory, and is very frequently confined to some portion of the machine in model form, and not to the machine as a whole.

Such research work is generally carried out either on a whirling table or in a wind tunnel, generally the latter, the circular course of the former being obviously a great drawback, and for anything like even fair results necessitating a very long arm.

The great advantage of the wind tunnel is that by means of having the model stationary and the air travelling past it, you can, by having a glass window in the tunnel close to the model observe very carefully and accurately what is going on.

Its chief disadvantage is that it must be of very large size in proportion to the size of the model if really accurate results are desired, which necessitates a powerful and expensive motor if the air is to be moved through the same at a high velocity. And it is experiments in winds of comparatively high velocities that are so much needed. Another manner in which such a problem could be tackled is by propelling or drawing such a model along a long wire or aerial line suitably supported at a high velocity. The model would have of course to be fitted with suitable self-recording instruments. In the writer's opinion not nearly enough use of this method has been made. Another method of attacking the problem would be by fitting a suitable attachment to a swift motor car. This latter method would have the great advantage that the model or part model experimented on would be under personal observation all the time.

Problems of stability appear to be most suitably studied in actual free flight.

If we except the model research work which has been carried out at the National Physical Laboratory, at a few technical colleges, and by some private individuals, but little work of this character has been carried out in this country. Such work, I am sorry to say, does not appear to appeal to the average aeromodelist in the least; in fact, you have only to bring up the subject, for him to look round for some avenue of escape. If you tell him that if the probable error in any single observation is 10 per cent. then at least 100 observations are necessary to reduce the probable error to 1 per cent.; that is quite enough, he wants to hear nothing more.

Where Model Experiments are so often at Fault.

And yet it is just in this very respect that ordinary model experiments or deductions are so often at fault. The observation itself and the consequent deduction may have been quite all right so far as they went; but the data, the number of the experiments made

were totally inadequate. The experiment may have been observed correctly and the deduction correctly reasoned out. And, on the other hand, either or both may be incorrect. Would you sooner risk your life, supposing such a course became necessary, on such, or on the mean of 100 carefully carried out experiments, of which the average result was taken, due allowances being made for probable sources of error in each case? There can be only one answer to such a question.

Scientific research work is often long, tedious and laborious, to say nothing of very often being expensive as well, but it is the only way in which to accumulate knowledge, which is at the same time accurate and precise and free from unconscious error. Such work does not possess either the ease or apparent attractiveness of breaking "records," but it is just this kind of work that has got to be if the model is to be of any use in the future development of aeroplanes. As to what part the model will play in:

The Future Development of the Aeroplane

is a matter which rests very much in the hands of aeromodelists themselves. It also undoubtedly depends very largely on how far the various aeronautical bodies at present are prepared to work together for the common good: to give and take and to offer suitable and adequate prizes for original research work on model lines of a character likely to be of use in full-sized work. Neither full-sized workers nor modelists alone could draw up such a scheme; it must be done by the concerted action of both, and a third party must be found who, blessed with more than an adequate quantity of this world's goods, is prepared to part with a few, with a view to adding to the sum of human progress and human knowledge.

Above all it is necessary that the various clubs and societies, to say nothing of firms and private individuals, must know what one another is doing or intending to do, not only that unnecessary overlapping shall be avoided, but in order that each shall be able to render mutual assistance when such is possible or friendly criticism where such is valuable.

There is practically a common agreement that the model both could and should be of use in the development of the aeroplane; what remains to be done is to find out and develop the best means to carry such into effect. I need hardly add in conclusion that any further suggestions in that direction will receive most careful consideration and be much appreciated by the author of this paper.

KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

Kite Competition.—On June 20th, the first kite contest of the season was held on Wimbledon Common, for prizes presented by Messrs. Brooke and Westhorp, of Brookite fame. It attracted an entry of twelve competitors. The results were as follows of the first six:—

No.	Competitor.	Make of kite.	Angle.	Stability.	Strength of construction.	Portability.	Total.
1	A. W. Howkins	Kamac triangular	106	100	60	50	316
2	A. Collins	Box and wing	82	84	60	50	276
3	W. Collins	Box and wing	68	95	60	50	272
4	A. T. K. Moir	Brookite	58	90	50	50	248
5	L. Ingram	Brookite	46	80	60	50	236
6	D. Staines	Box and wing	48	65	55	50	218

The angle marks are 1 mark for each degree attained plus 3 extra for each degree above 50. The prizes were Brookites: 1st, value 35s.; 2nd, value 25s.; and 3rd, value 15s. The judges were F. Pringuer and the general hon. secretary.

Game Cup Competition.—This contest takes place on Wanstead Flats tomorrow, 27th, at 3 p.m. For route, see the Leytonstone's Club notes of 20th.

Model Competition.—To be held on Wimbledon Common on July 11th, at 3 o'clock; entries close July 4th. Steering competition for models rising off the ground. Prizes:—1st, cup; 2nd, silver medal of the Association; 3rd, bronze medal of the Association. Tests: A. Straight flight ahead; B. Figure of eight; maximum marks, 100; 50 for each test. Additional rules governing this competition: 1. To qualify for test A, models must fly straight for not less than 50 yds. 2. To qualify for test B, models must make one complete figure of an eight, controlled by mechanical means and not by odd propellers. 3. Models must not weigh less than 6 ozs. 4. Competitors must be at the judges' flag at 2.30 sharp. Those not present at that time will be disqualified. Junior r.o.g. duration competitions; age, 16 and under; marks: duration, actual seconds. Prizes: 1st, r.o.g. model, 45s., presented by Mr. A. F. Houlberg; 2nd, model value 25s., presented by Mr. H. Bond; 3rd, model value 15s., presented by Murray, Son, and Co. For rules see pages 5 and 6 of programme. Additional rules governing this competition: 1. Competitors must be at the judges' flag at 2.30 p.m. Any competitor not present at that time will be disqualified. 2. Models may be of any weight and of any kind, home-made or purchased. 27, Victory Road, Wimbledon. W. H. AKEHURST, Gen. Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Bristol and West of England Aero Club (Model Section)
(42, ROYAL YORK CRESCENT, CLIFTON, BRISTOL).

Bristol International Exhibition.—More than 30 models have already been entered for the Model Aeroplane Exhibition and Competition, and further entries are expected. It has been decided that competitors not resident in Bristol or Bath will not be required to exhibit their models from July 11th to 18th (although they are invited to do so), and they will therefore be able to bring their machines with them to Bristol on July 18th. A member of the Bath and

Somerset Aero Club will bring the exhibits from Bath to the Exhibition on July 11th. In view of this alteration in the conditions, late entries may now be sent in not later than June 30th. The events and excursion arrangements were announced in FLIGHT on June 12th and 19th.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

JUNE 27TH, Gamage Cup Competition on Wanstead Flats, 3 p.m. For route see last week. JUNE 28th flying Wanstead Flats, 6.30 and 10.30 a.m.

UNAFFILIATED CLUBS.

Birmingham Aero Club (8, FREDERICK ROAD, EDGBASTON).

THE competitions for the Midland and English championships have both been postponed to Saturday, August 15th, owing to the club's ground being down for hay. Full particulars on application to the Hon. Sec.

Finsbury Park and District (66, ELFORT ROAD, HIGHBURY, N.).

JUNE 27TH, flying at Finsbury Park from 3 p.m.

Ilford Model Ae.C. (83, ENDSLEIGH GARDENS, ILFORD).

JUNE 28TH, Second Competition Meeting at 9.15 (weather permitting) at the aerodrome, Hog Hill, Hainault Forest, Chigwell Row:—Event I, Charles and Co. prize, h.l. duration handicap. Event II, simultaneous handlaunching, senior and junior sections. Event III, senior section, twin-pusher, r.o.g. duration; minimum length of machine, 36 ins. Event IV, senior section, tractors, r.o.g. duration. Event V, senior section, single-pusher, r.o.g. duration; minimum length of machine, 36 ins. Event VI, junior section, lightweights, h.l. duration; maximum length, 30 ins. Event VII, junior section, single-pusher, h.l. duration; minimum length, 30 ins. Event VIII, lightweights, r.o.g. duration; maximum length of machine, 30 ins. N.B.—All lightweights must be twin-pushers (0-1-1-P2 type). Competitors who are not at the judges' flag at 9.15 sharp will be disqualified. Three trials will be allowed per event except Events I and II. Judges: Messrs. H. Corrigan, F. M. Connellan and J. B. Fitzsimons. Timekeeper: J. B. Fitzsimons.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

JUNE 27TH, Woolwich Common, 3.30 to 6 p.m.; 28th, Blackheath, 6.30 to 10 a.m.



AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

1. **Elections.**—Members: John H. Patterson, Jan Schiere, Col. the Right Hon. J. E. B. Seely. Assoc. Member: Lieut.-Col. Stanhope Pedley. Foreign Member: John Gadsby.

2. **Associate Fellowship Election.**—Application forms for the next election of Associate Fellows, which will take place in July, can now be obtained from the secretary, and it should be noted that it is not necessary that the applicants should be members of the Society. Full details will be announced later.

3. **Joint Committee with the Royal Meteorological Society.**—The following gentlemen have been appointed to serve on the above Committee: Col. H. E. Rawson, C.B. (Chairman), Dr. T. E. Stanton, Lieut.-Col. F. H. Sykes, Alec Ogilvie, and another representing this Society; C. J. P. Cave, Dr. C. Chree, J. S. Dines, and G. K. Lempert representing the Royal Meteorological Society.

4. **Award of the Society's Gold Medal.**—As will be seen by the separate announcement, the Gold Medal of the Society has been awarded to Professor G. H. Bryan, Sc.D., F.R.S., for the great services he has rendered to aeronautics by his development of the theory of the stability of aeroplanes.

5. **Library.**—The Council desire to thank the Royal Institution of Great Britain for the following gifts to the Library:—

"Photography of the Paths of Particles Ejected from Atoms."

By C. T. R. Wilson, M.A., F.R.S.

"Gyrostats and Gyrostatic Action." By Professor A. Gray, M.A.

"The Winds in the Free Air." Charles J. P. Cave, M.A., J.P.

"Fluid Motions." The Right Hon. Lord Rayleigh.

"The Gyrostatic Compass and Practical Applications of Gyrostats." G. K. B. Elphinstone, M.I.E.E.

"Travelling at High Speeds on the Surface of the Earth and above it." Professor H. S. Hele-Shaw, LL.D., M.I.C.E.

"Icebergs and their Location in Navigation." Professor H. T. Barnes, D.Sc., F.R.S.

"The Pressure of a Blow." Professor B. Hopkinson, M.A., F.R.S.

"Recent Advances in Scientific Steel Metallurgy." Professor J. O. Arnold, D.Met., F.R.S.

"Recent Advances in Turbines." Hon. Sir C. A. Parsons, K.C.B. B. G. COOPER, Secretary.

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